

Service
Service
Service



20TA1000/93

Service Manual

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1. Technical Specifications and Connections

Index of this chapter:

- 1.1 Technical Specifications
- 1.2 Connections

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

1.1 Technical specifications

1.vision

Type NR. : A201SN02 (AUO)
Display area(mm) : 408(H) x 306(V) (20.1-inch diagonal)
Display mode : TN type, Normal white + SWV film
Number of Pixels : 800(H) x 600(V)
Pitch (mm) : 0.51(H) x 0.51(V)
Color pixel arrangement : RGB vertical stripes
Display mode : normally white TN
Number of color : 16.7M (8 bits)
Brightness (cd/m²) : 450nit(typ.)
Viewing angle : -80° ~ 80° (H), -60° ~ 60° (V)(Typ.)
Response time : 16ms typ. (Tr+Tf)
Surface treatment : Hard Coating + AR
Electrical interface : TTL (1 port)
Total module power(W) : 35W(typ.)
Contrast ratio : Typical 500 : 1
Overall dimension (mm) : 448(W) x 347(H) x 23(D)(max.)
Module weight (g) : 3500
Backlight : 6 CCFL

2.Following table is the detail TV System list.

TV system	Position of sound carrier (MHz)	Sound system	Color system	Country
M	4.5/4.724212	FM-Stereo(A2)	NTSC	Korea
	4.5	FM-FM(EIA-J)	NTSC	Japan
	4.5	BTSC-stereo+SAP	NTSC	USA
N	4.5	BTSC-stereo+SAP	PAL	Argentina
B/G	5.5/5.7421875	FM-stereo(A2)	PAL	Germany, Austria, Switzerland, Italy, Netherlands,
	5.5/5.85	FM-Mono/NICAM	PAL	Belgium, Spain, Denmark, Finland, Norway, Sweden, France
L	6.5/5.85	AM-Mono/NICAM	SECAM-L	
I	6.0/6.552	FM-Mono/NICAM	PAL	Great Britain, Hong Kong, Ireland
D/K	6.5/6.2578125	FM-Stereo (A2,D/K1)	SECAM-East	Slovak. Rep.
	6.5/6.7421875	FM-Stereo (A2,D/K2)	PAL	None
	6.5/5.7421875	FM-Stereo (A2,D/K3)	SECAM-East	Poland
	6.5/5.85	FM-Mono/NICAM(D/K,NICAM)	PAL	China, Hungary

3.Miscellaneous

Power supply

Power consumption : Operating 55 W (typical)
Power cord length : 1.8M
Power cord type : USA type
Power indicator : LED (On: Green ,Sleeping mode: Amber)
Auto power saving : EPA

Operating

-Temperature C : 0°C to 35°C
-Humidity : 20% ~ 80 %
-Altitude : 0-3658m
-Air pressure : 600-1100mBAR

Storage

-Temperature C : -20 to 60°
-Humidity : 95% max (< 40°C)
-Altitude : 0-12192m
-Air pressure : 300-1100mBAR

Note: Recommend at 0 to 35°C, Humidity less than 60 %

1.2 Connections: please refer to the DFU for details

1.2.1 PC input connectors

Input analog D-sub connector pin assignment:

PIN No.	SIGNAL
1	Red
2	Green
3	Blue
4	GND
5	GND
6	Red GND
7	Green GND
8	Blue GND
9	+5V (Supply from PC)
10	Sync GND
11	GND
12	Bi-directional data
13	H-sync
14	V-sync
15	Data clock

Sync polarity :

-Hori.sync positive/negative
-Vert.sync positive/negative

1.PC Signal type

Analog Video: 0.7 Vp-p Linear , positive polarity

Sync : TTL level , separate , positive or negative polarity

2.TV signal type

RF signal Aerial input

Video signal : S-video input

CVBS

YPbPr

3.Audio signal : S-video L/R ,YPbPr L/R audio input

PC line in

2. Safety Instructions, Warnings and Notes

index of this chapter:

- 2.1 Safety Instructions
- 2.2 Warnings
- 2.3 Notes

2.1 Safety Instructions

Safety regulations require that during a repair:

- Connect the set to the AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ▲, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the AC Power lead for external damage.
- Check the strain relief of the AC Power cord for proper function.
- Check the electrical DC resistance between the AC Power plug and the secondary side (only for sets which have a AC Power isolated power supply):
 1. Unplug the AC Power cord and connect a wire between the two pins of the AC Power plug.
 2. Set the AC Power switch to the "on" position (keep the AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
 4. Switch "off" the set, and remove the wire between the two pins of the AC Power plug.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD▲). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

1. Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⚡), or hot ground (⚡), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
2. Where necessary, measure the waveforms and voltages with (↗) and without (↘) aerial signal. Measure the voltages in the power supply section both in normal operation (⚡) and in stand-by (⚡). These values are indicated by means of the appropriate symbols.
3. The semiconductors indicated in the circuit diagram and in

the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

4. Manufactured under license from Dolby Laboratories. "Dolby" and the "double-D symbol", are trademarks of Dolby Laboratories.

2.3.2 Schematic Notes

1. All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
2. Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
3. All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
4. Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
5. An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
6. The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.3.3 Rework on BGA (Ball Grid Array) Ics

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB. To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA. Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent. After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.

Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device Replacement

The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. To reflow the solder, apply a temperature profile according to the IC data sheet. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

More Information

For more information on how to handle BGA devices, visit this URL: www.atyourservice.ce.philips.com (needs subscription, not available for all regions). After login, "select Magazine", then go to "Workshop Information". Here you will find Information on how to deal with BGA-ICs.

2.3.4 Lead Free Solder

Philips CE is going to produce lead-free sets (PBF) from 1.1.2005 onwards.
Lead-free sets will be indicated by the PHILIPS-lead-free logo on the Printed Wiring Boards (PWB):



Fig 2-1 Lead-free logo

This sign normally has a diameter of 6 mm, but if there is less space on a board also 3 mm is possible.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

1. Always use the highest temperature to solder, when using SAC305 (see also instructions below).
2. De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you must use the correct temperature profile, which is coupled to the 12NC. For an overview of these profiles, visit the website www.atyourservice.ce.philips.com (needs subscription, but is not available for all regions). You will find this and more technical information within the "Magazine", chapter "Workshop information".
For additional questions please contact your local repairhelpdesk.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

1. Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.

2. Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able
 - To reach at least a solder-tip temperature of 400 °C.
 - To stabilise the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.

3. Adjust your solder tool so that a temperature around 360 °C - 380 °C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400 °C; otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.

4. Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to avoid mixed regimes. If not to avoid, clean carefully the solder-joint from old tin and re-solder with new tin.
5. Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.

6. Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened short before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-) pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90 °C) for drying (think of ESD-protection!).

Do not re-use BGAs at all!

7. For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

2.3.5 Practical Service Precautions

1. **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
2. **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

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4. Mechanical Instructions

Index of this chapter:

- 4.1 Assy/Panel Removal
- 4.2 Set Re-assembly

4.1 Assy/Panel Removal

Front view



Back view



Step 1. Remove the stand.

Remove the three screws as Fig.2, Fig.3

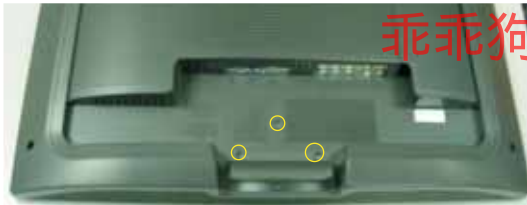


Fig.3

Step 2. Remove the Back cover as Fig.4~7.

- a. Remove the 4 screws on the back cover as Fig.4
- b. Use thin "I" type screwdriver to push 2 clicks on bottom side and use thin "I" type screwdriver to open the bottom side as Fig.5
- c. Use thin "I" type screwdriver to push 2 clicks on top side and use thin "I" type screwdriver to open the top side as Fig.6
- d. Remove the back cover as Fig.7.



Fig.4



Fig.5



Fig.6



Fig.7

Fig.1

Fig.2

Step 3: Remove the shielding

- a. Remove the 4 screws as Fig.8 Fig.9
- b. Remove the shielding as Fig.10



Fig.8



Fig.9



Fig. 10

Step 4. Remove the YPbPr-IN,Scaler, KEY ,IR and inverter board.

- a). Remove the 2 screws and disconnect the 10 cables as Fig. 10 to remove the YPbPr-IN board.
- b). Remove the 4 screws and disconnect the connector as Fig.11 to remove the scaler board.
- c). Remove the 2 screws and disconnect the connector as Fig.12 to remove the inverter board.
- d). Remove the screw and disconnect the connector as Fig.13 to remove the IR board.

e). Remove the control board and open the click ,disconnect the connector as Fig.14-Fig.15

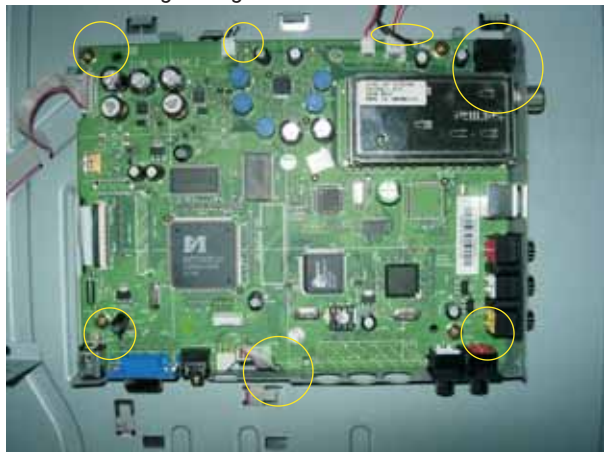


Fig.11



Fig.15



Fig.12

Step 5. Remove the 4 screws as Fig.16 to remove the speaker

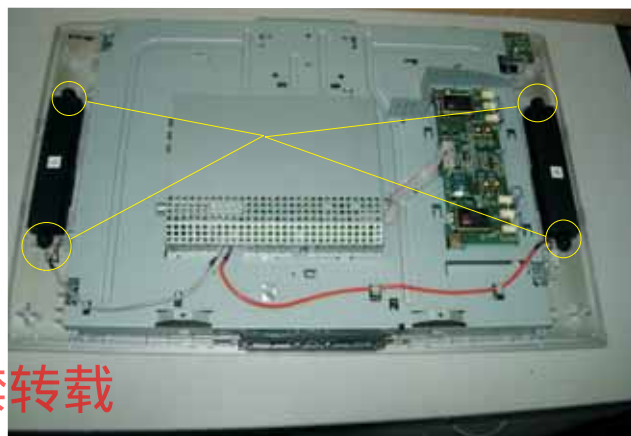


Fig. 16

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Fig. 13



Fig.17

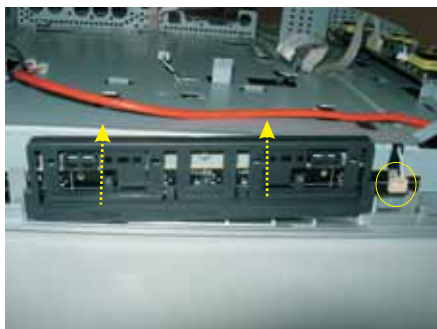


Fig. 14

Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position.
- Pay special attention not to damage the EMC foams at the SSB shielding. Check that EMC foams are put correctly on their places.

In warranty, it is not allowed to disassembly the LCD panel, even the backlight unit defect.

Out of warranty, the replacment of backlight unit is a correct way when the defect is cused by backlight (CCFL,Lamp).

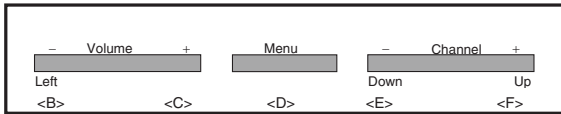
5. Aging and Factory Mode

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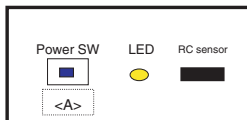
5.1 Access Aging Mode

5.2 Access Factory Mode

Top Control



Front Control



5.1 Access Aging Mode

Step 1 : Disconnect Interface Cable between Monitor and PC.

Step 2 : Turn off LCD monitor. Then press power "⏻" button. Then quickly push "+" and "-" of Volume, and hold this two buttons until comes out "AGING screen" => then release all buttons.

Bring up:



After 52 seconds,
bring up:



After 60 seconds,
bring up:



After 52 seconds,
bring up:



repeatedly
Connect Signal cable again=> go back to normal display

5.2 Access Factory Mode

- 1). Turn off monitor.
- 2). Press power "⏻" button. Then quickly push "+" and "-" of Volume, and hold this two buttons, then the screen comes out "Waiting For Automatic Adjustment", then the screen will be black for one second until comes out "Windows screen" => then release this two buttons.
- 3). Press "MENU" button, wait until the OSD menu with Characters "CHINA MAGNAVOX32 V0.2.0 051012 CLAA320WA01" (below OSD menu) come on the Screen of the monitor.



Factory Mode indicator

Factory Menu

Cursor can move on gray color area

Hot key function: at factory mode, press "MENU" button, then press "+" and "-" of Channel to the factory mode indicator, then press "+" of Volume. Press the "+" and "-" of Channel to "exit" and press "MENU" to exit factory adjust menu.



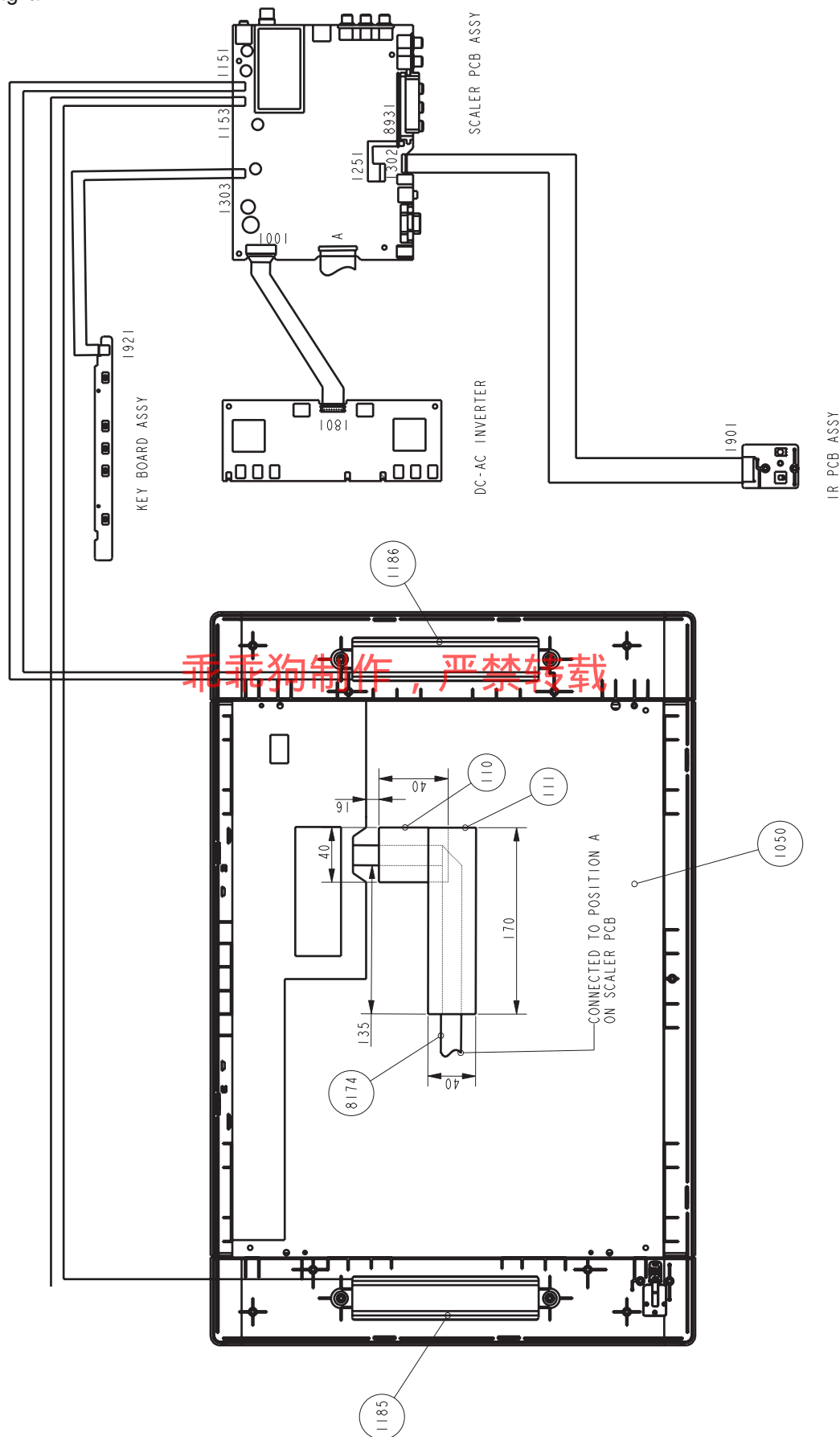
6. Block Diagram

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6.1 Wiring Diagram

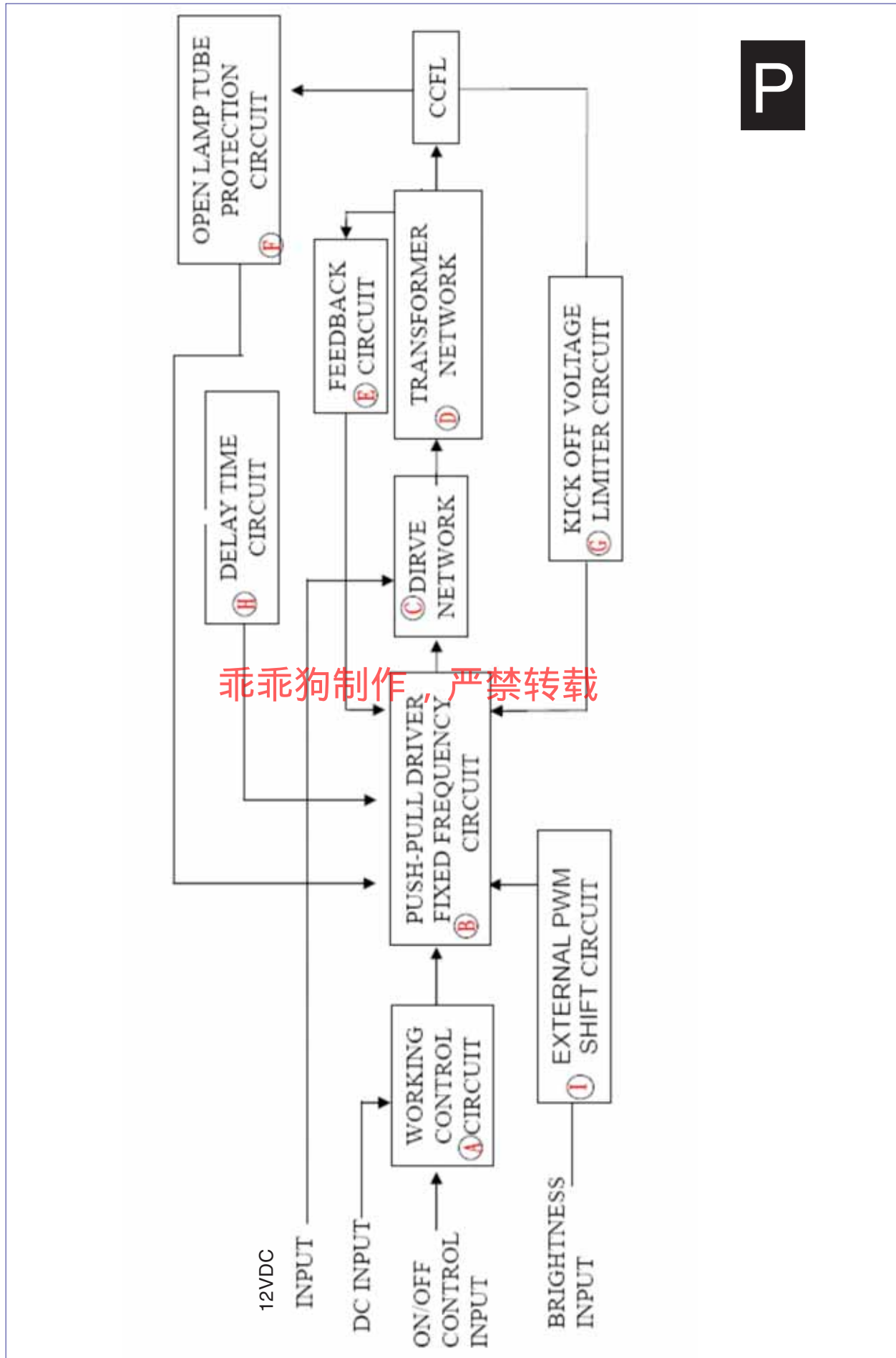
6.2 Block Diagram

6.1 Wiring Diagram

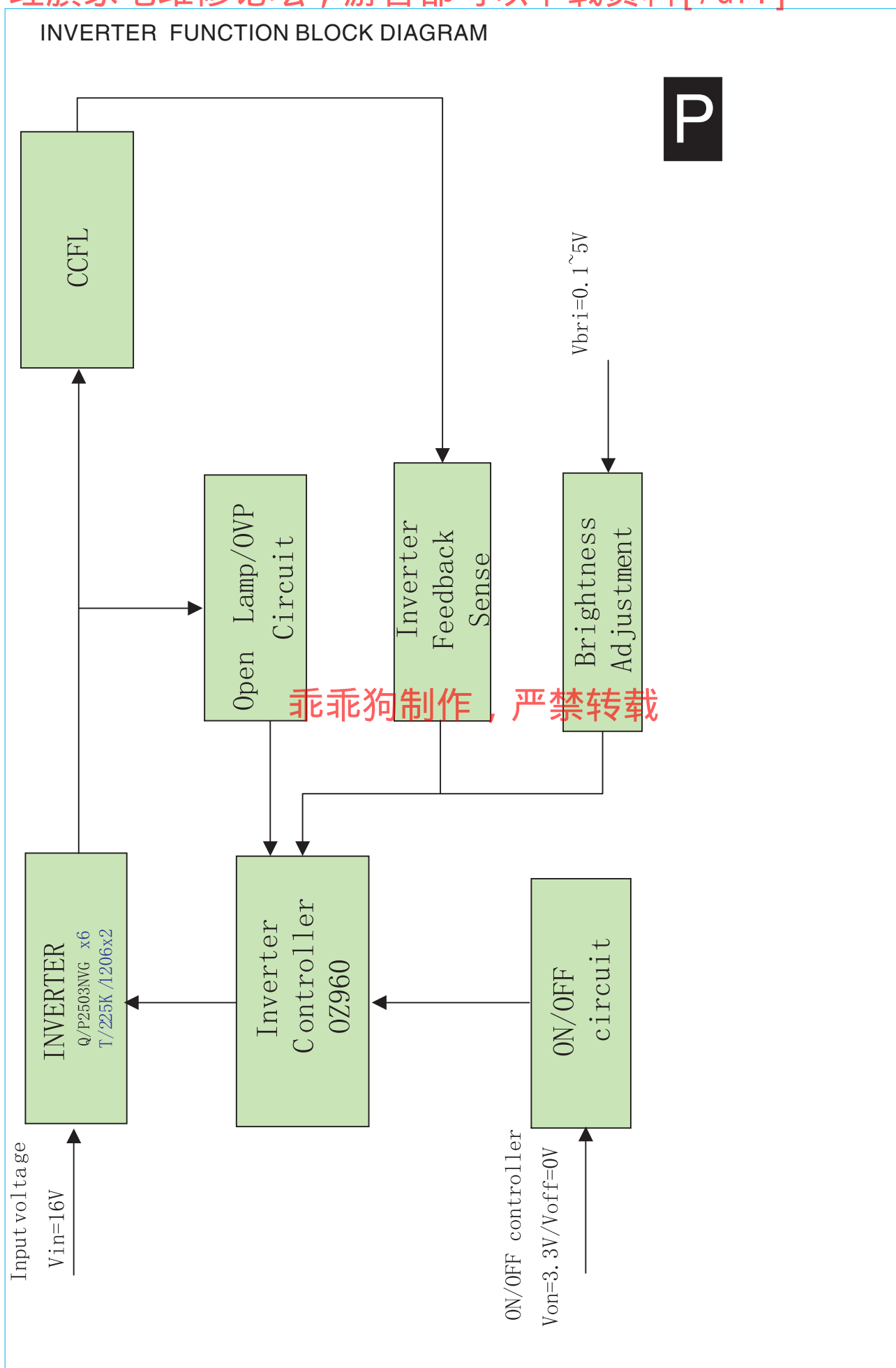


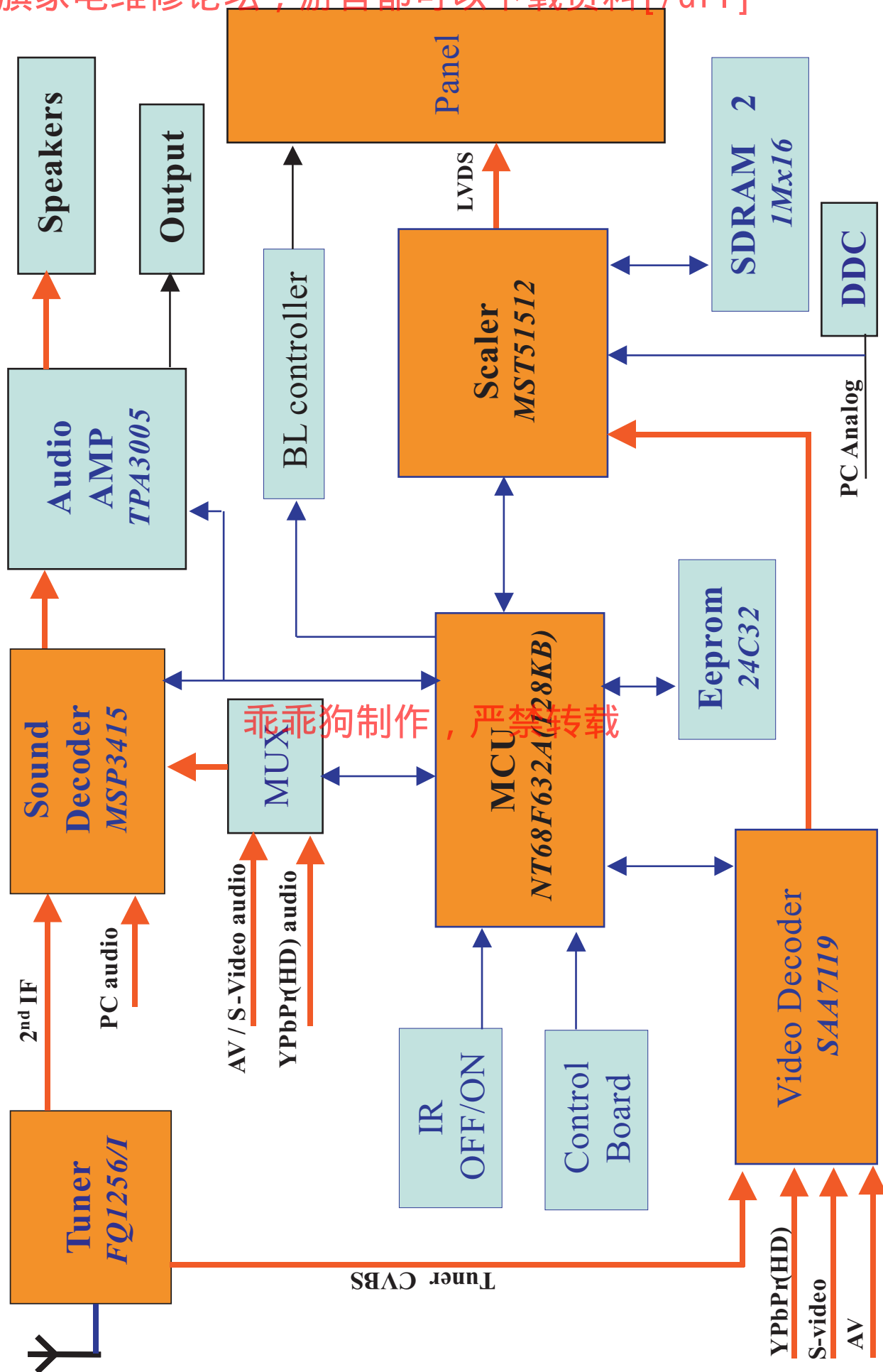


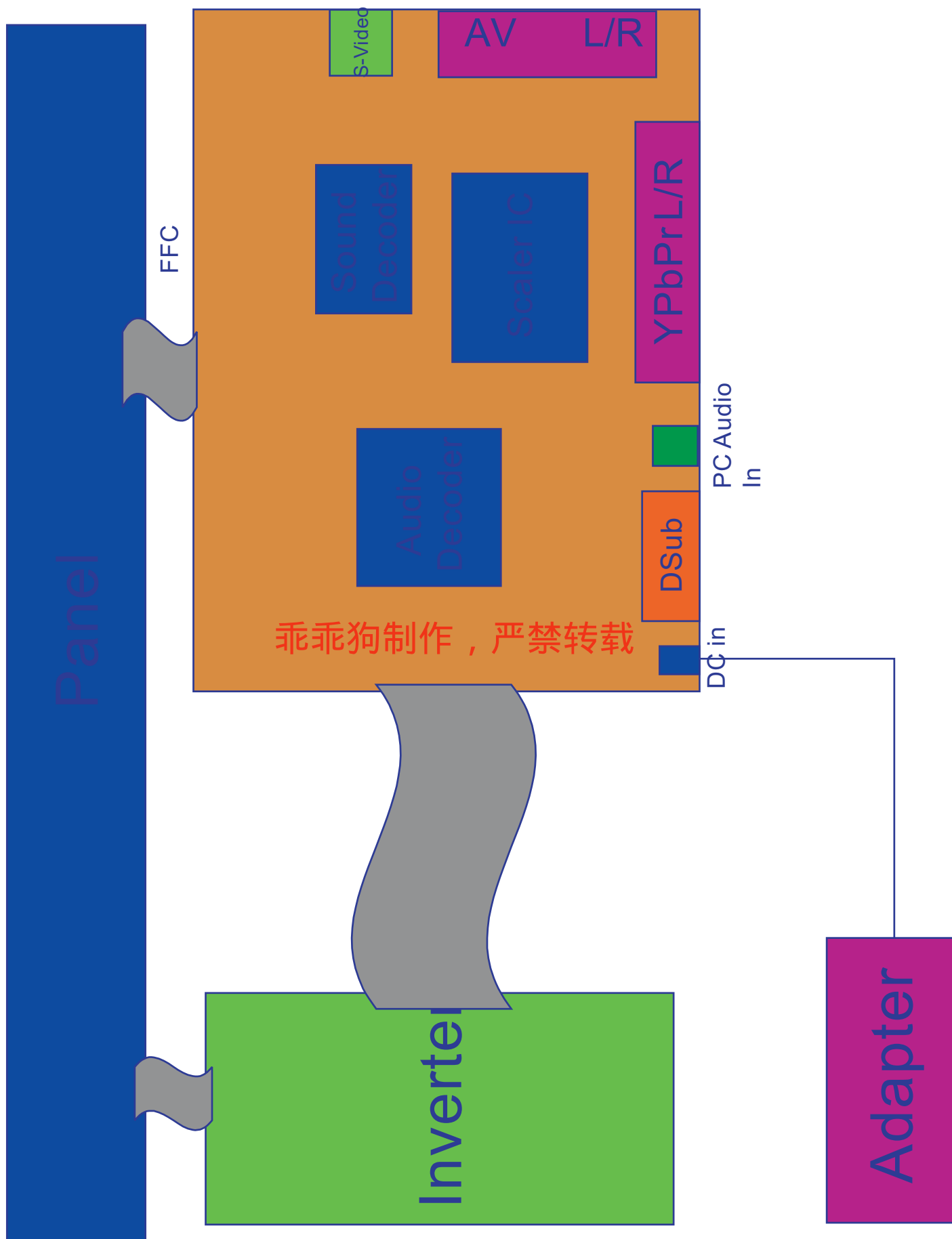
INVERTER BLOCK DIAGRAM



P



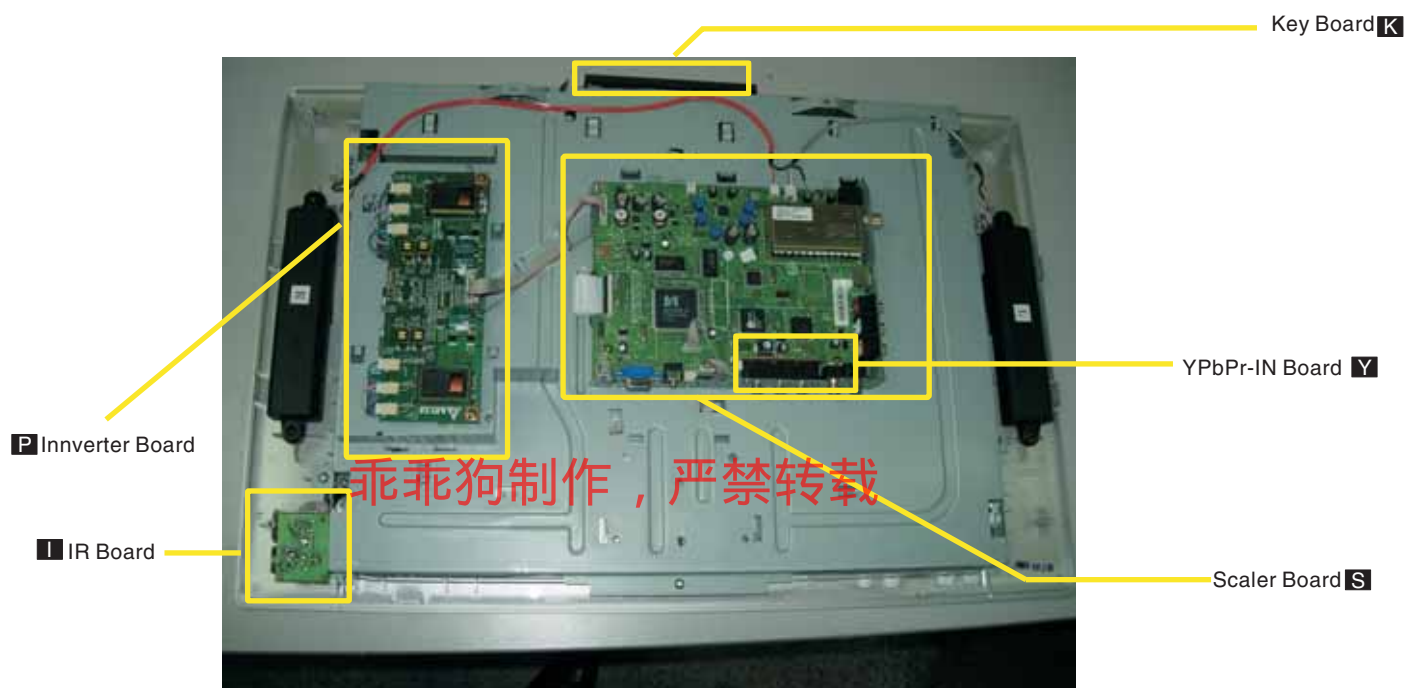


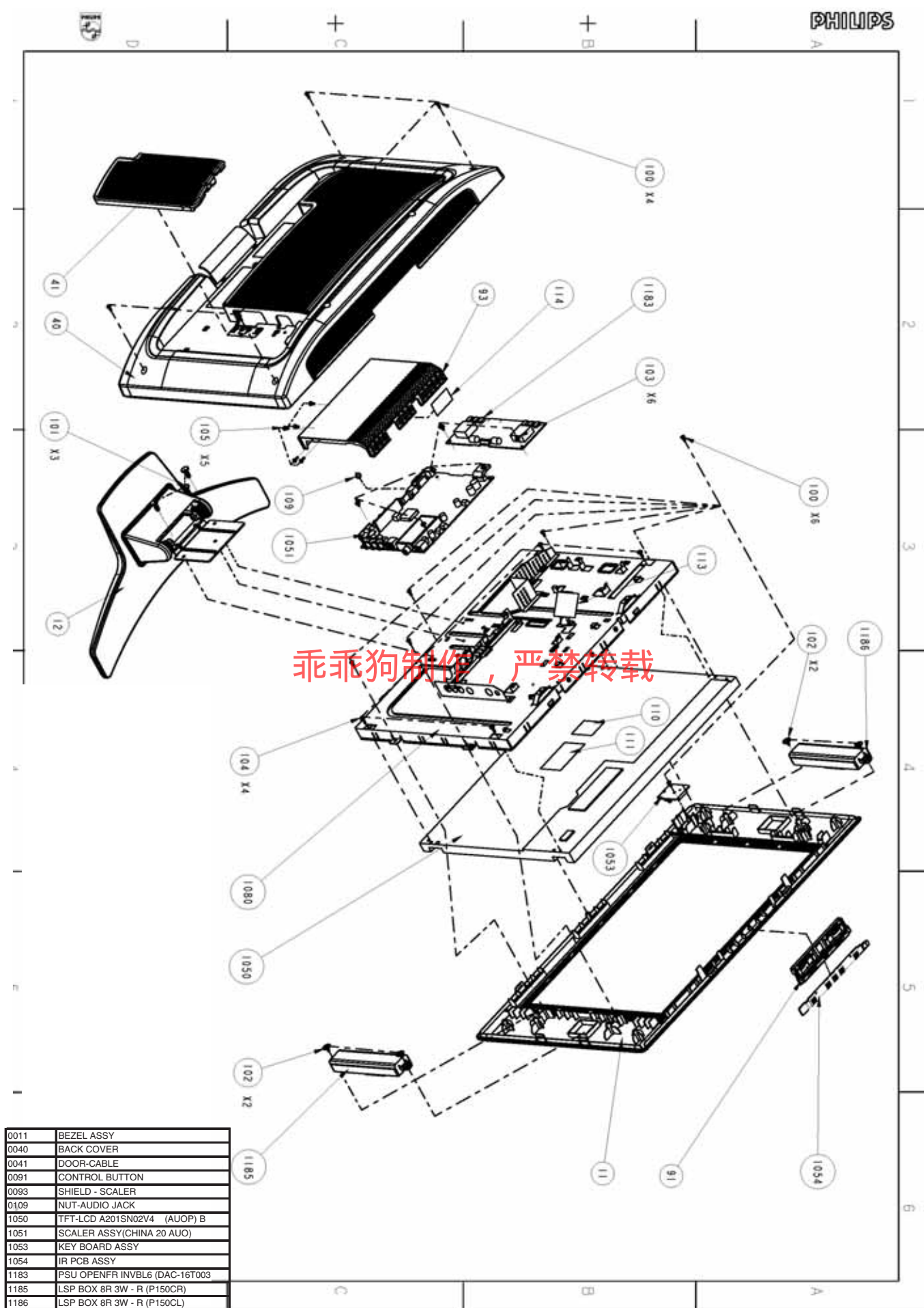


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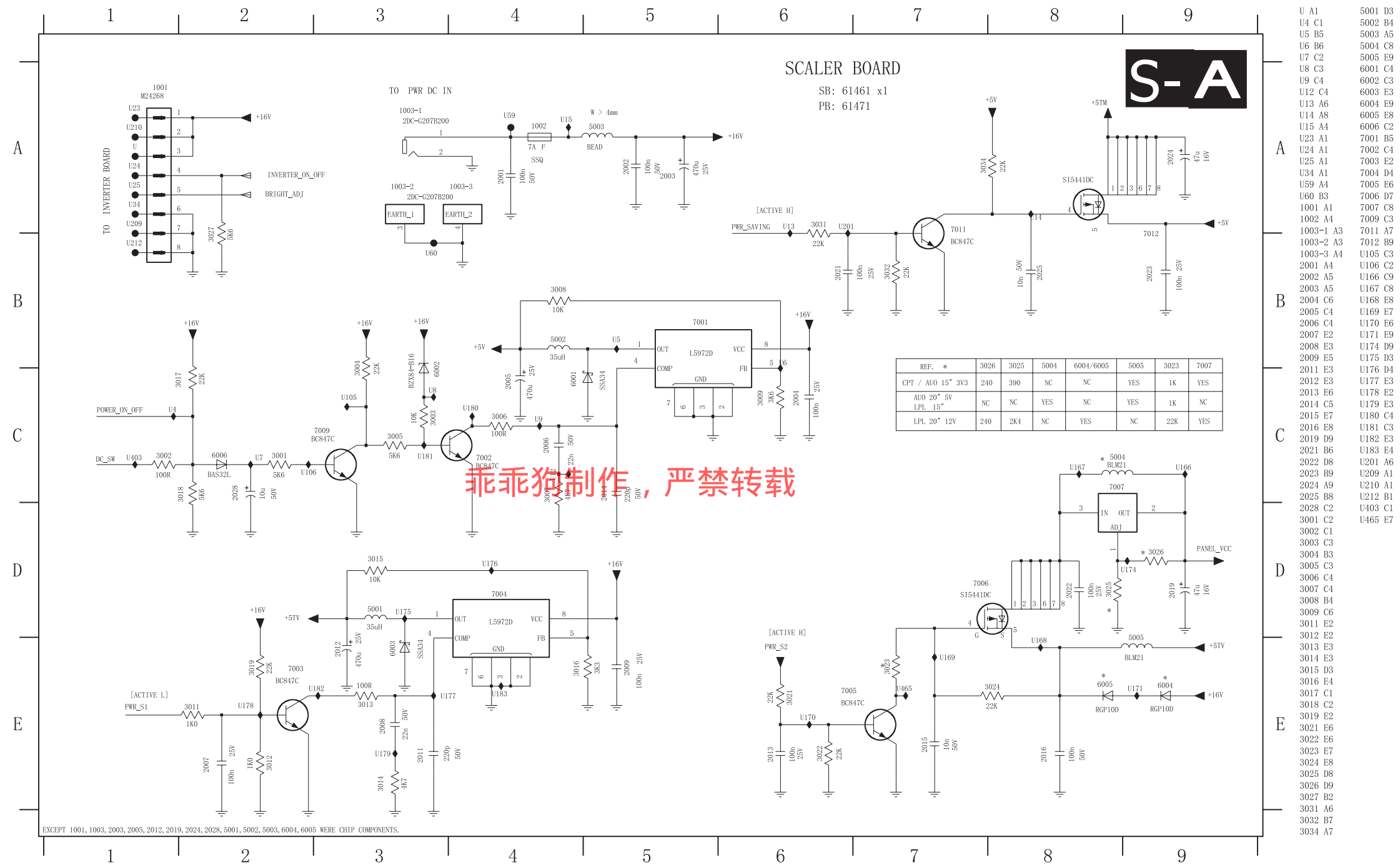
- 7.1 Chassis Overview
- 7.2 Exploded View
- 7.3 Scaler Schematic Diagram & Layouts
- 7.4 Power Schematic Diagram & Layouts
- 7.5 Key PCB Schematic Diagram & Layouts
- 7.6 IR PCB Schematic Diagram & Layouts
- 7.7 YPbPr-IN PCB Schematic Diagram & Layouts

7.1 Chassi Overview





7.3.1 Scaler Schematic Diagram - power



7. Circuit Diagrams and PWB Layouts



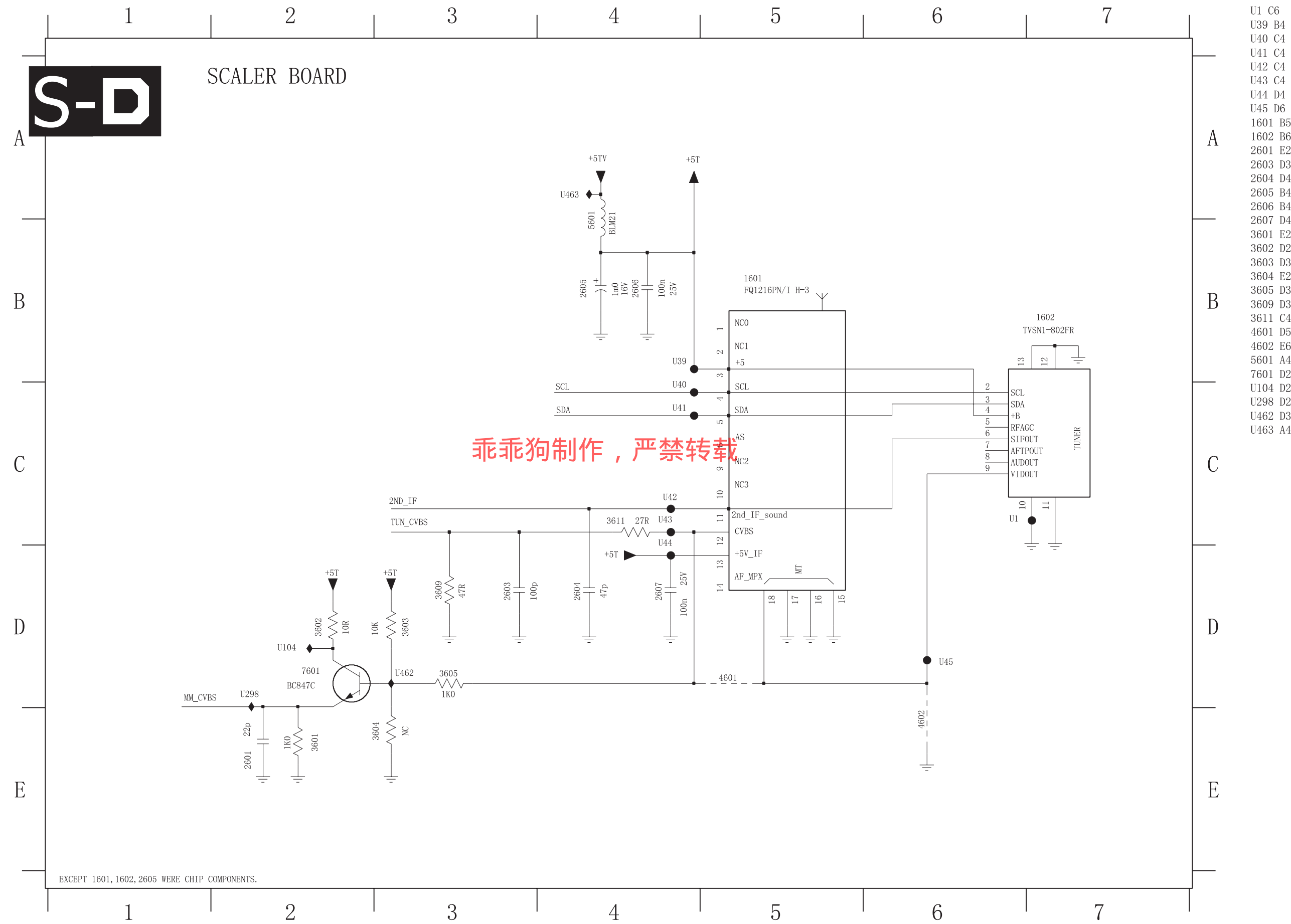
7.3.3 Scaler Schematic Diagram - SCART



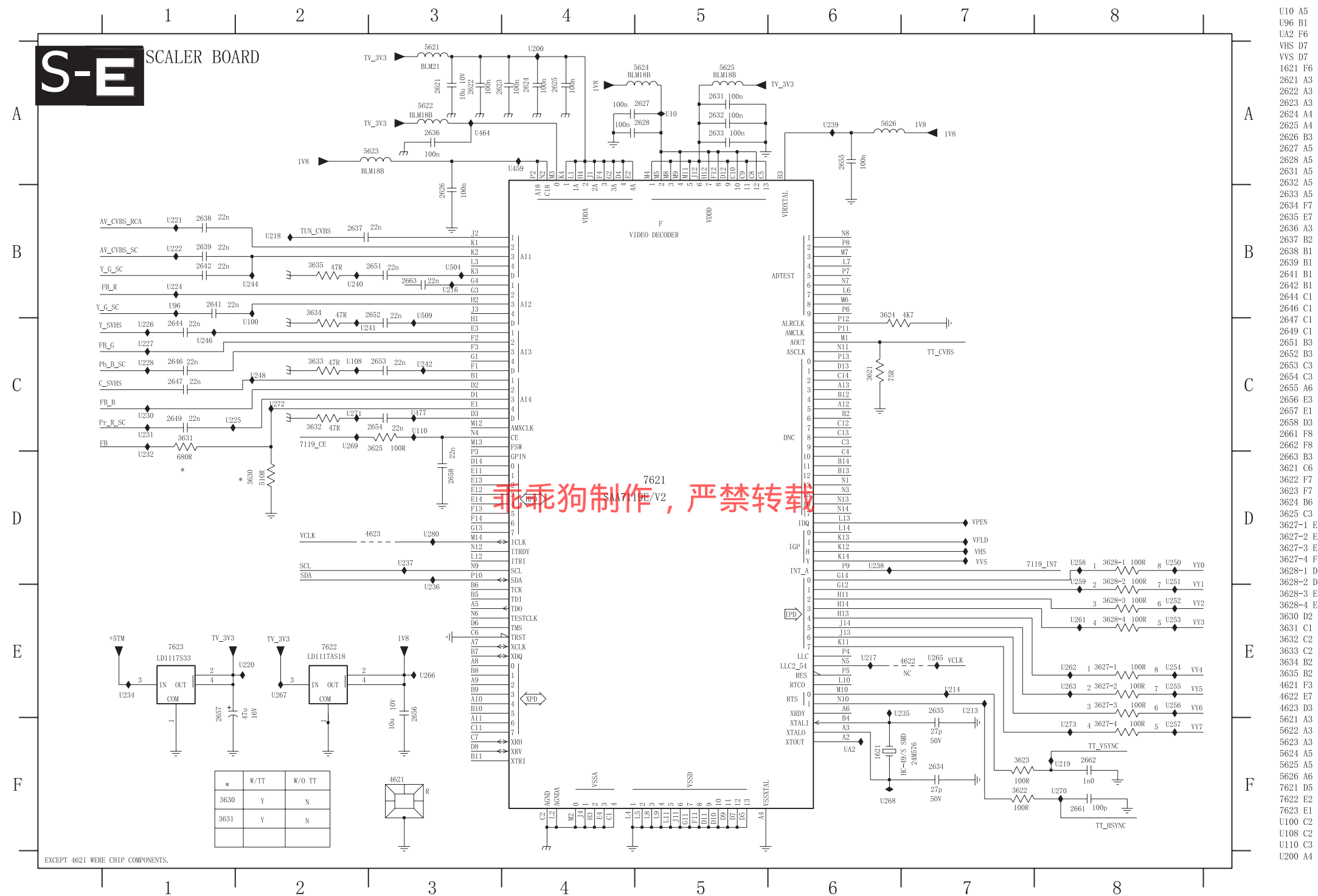
EXCEPT 1251, 1252, 1253, 1254, 1255 WERE CHIP COMPONENTS

S-C

7.3.4 Scaler Schematic Diagram - VIDEO IN



7.3.5 Scaler Schematic Diagram - VIDEO DECODER



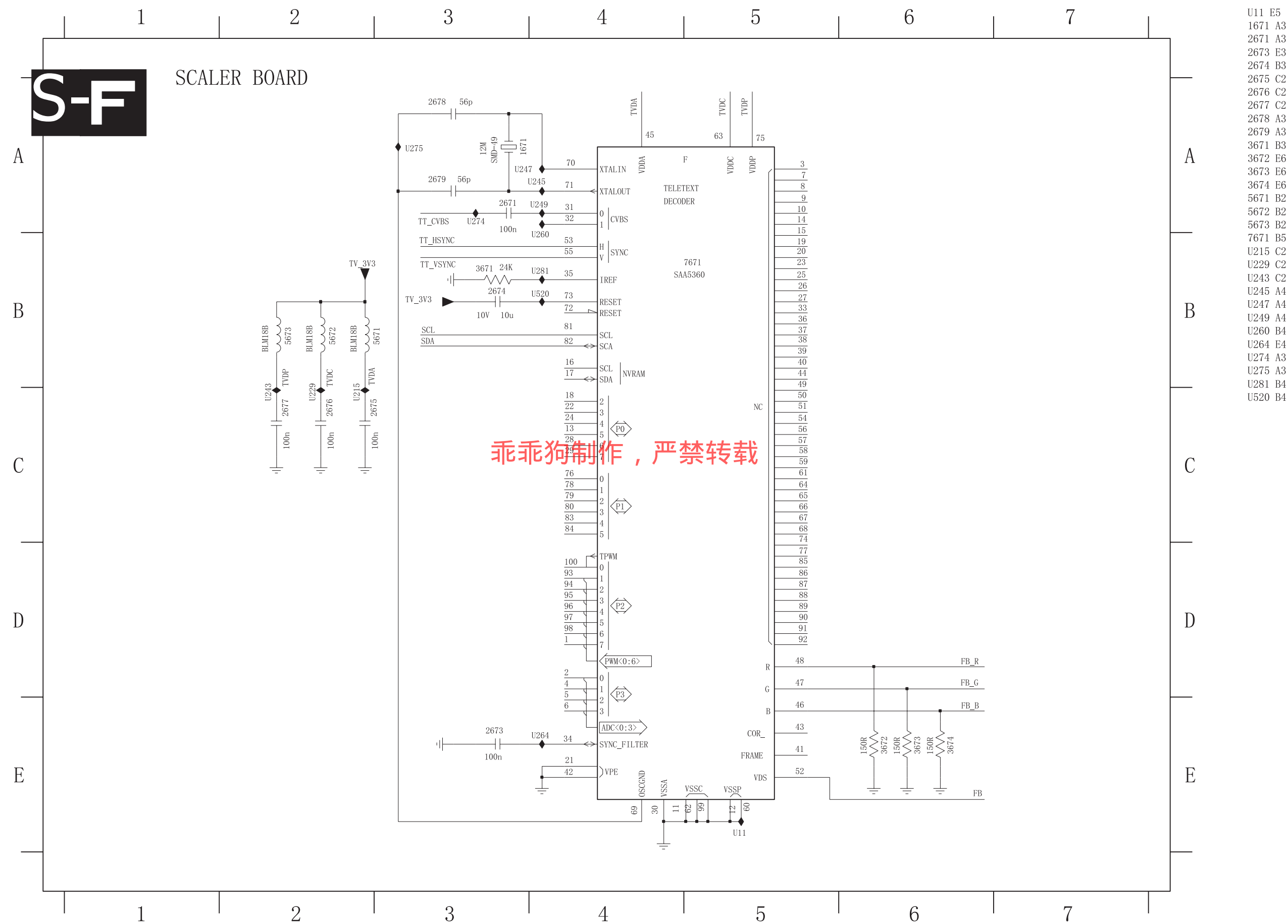
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EXCEPT 4621 WERE CHIP COMPONENTS

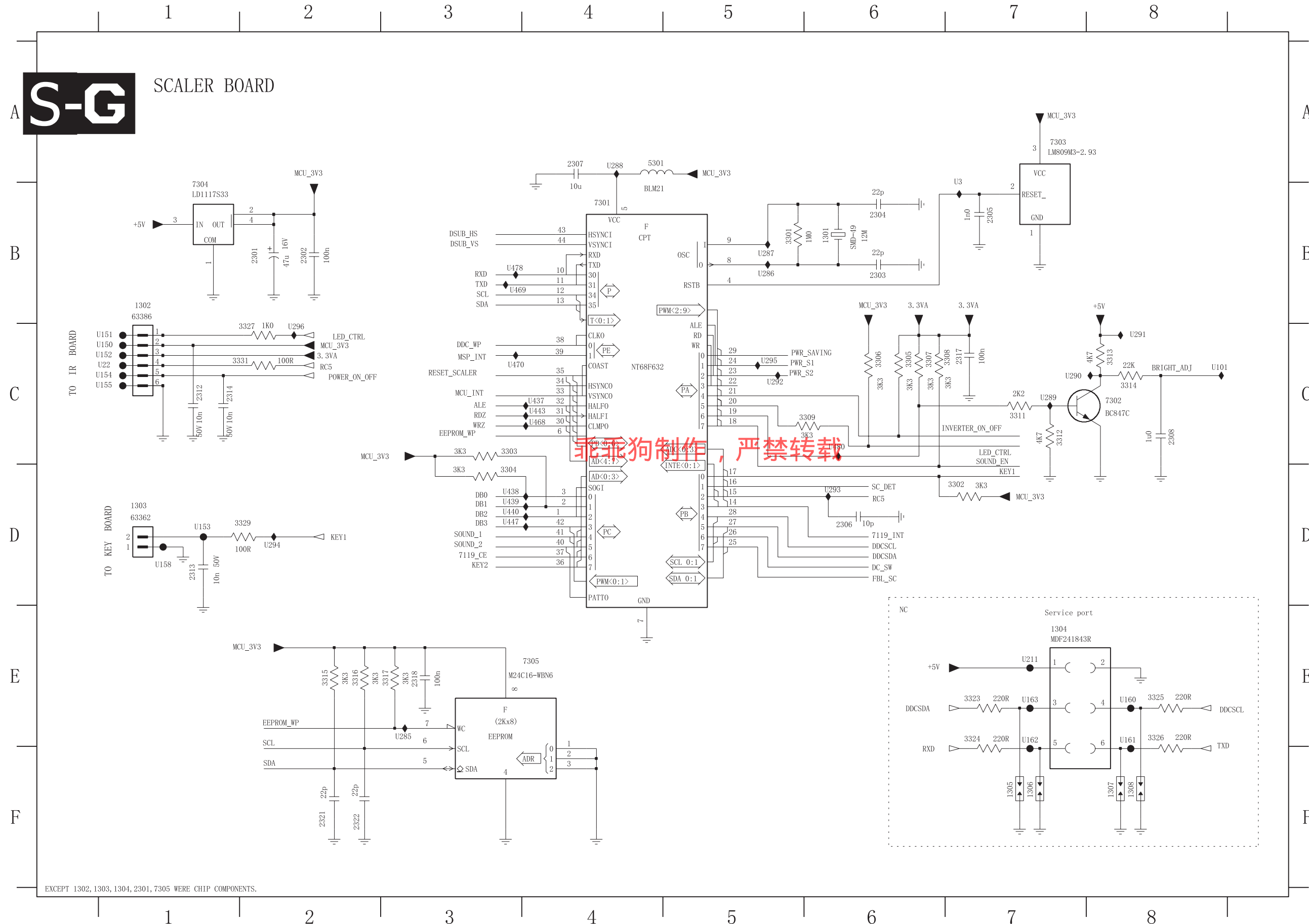
*	W/TT	W/O TT
3630	Y	N
3631	Y	N

U10 A5	U213 E7
U96 B1	U214 E7
U42 F6	U216 B3
VHS D7	U217 E6
VVS D7	U218 B2
1621 F6	U219 F8
2621 A3	U220 E2
2622 A3	U221 B1
2623 A3	U222 B1
2624 A4	U224 B1
2625 A4	U225 C2
2626 B3	U226 C1
2627 A5	U227 C1
2628 A5	U228 C1
2631 A5	U230 C1
2632 A5	U231 C1
2633 A5	U232 D1
2634 F7	U234 E1
2635 E7	U235 E6
2636 A3	U236 D3
2637 B2	U237 D3
2638 B1	U238 D6
2639 B1	U239 A6
2641 B1	U240 B2
2642 B1	U241 C2
2644 C1	U242 C3
2646 C1	U244 B2
2647 C1	U246 C1
2649 C1	U248 C2
2651 B3	U250 D8
2652 B3	U251 D8
2653 C3	U252 E8
2654 C3	U253 E8
2655 A6	U254 E8
2656 E3	U255 E8
2657 E1	U256 E8
2658 D3	U257 F8
2661 F8	U258 D8
2662 F8	U259 D8
2663 B3	U261 E8
3621 C6	U262 E8
3622 F7	U263 E8
3623 F7	U266 E3
3624 B6	U267 E2
3625 C3	U268 F6
3627-1 E8	U269 C2
3627-2 E8	U270 F8
3627-3 E8	U271 C2
3627-4 F8	U272 C2
3628-1 D8	U273 F8
3628-2 D8	U280 D3
3628-3 E8	U459 A4
3628-4 E8	U464 A3
3630 D2	U477 C3
3631 C1	U504 B3
3632 C2	U509 C3
3633 C2	VFLD D7
3634 B2	VPEN D7
3635 B2	
4621 F3	
4622 E7	
4623 D3	
5621 A3	
5622 A3	
5623 A3	
5624 A5	
5625 A5	
5626 A6	
7621 D5	
7622 E2	
7623 E1	
U100 C2	
U108 C2	
U110 C3	
U120 A4	

7.3.6 Scaler Schematic Diagram - T/T DECODER



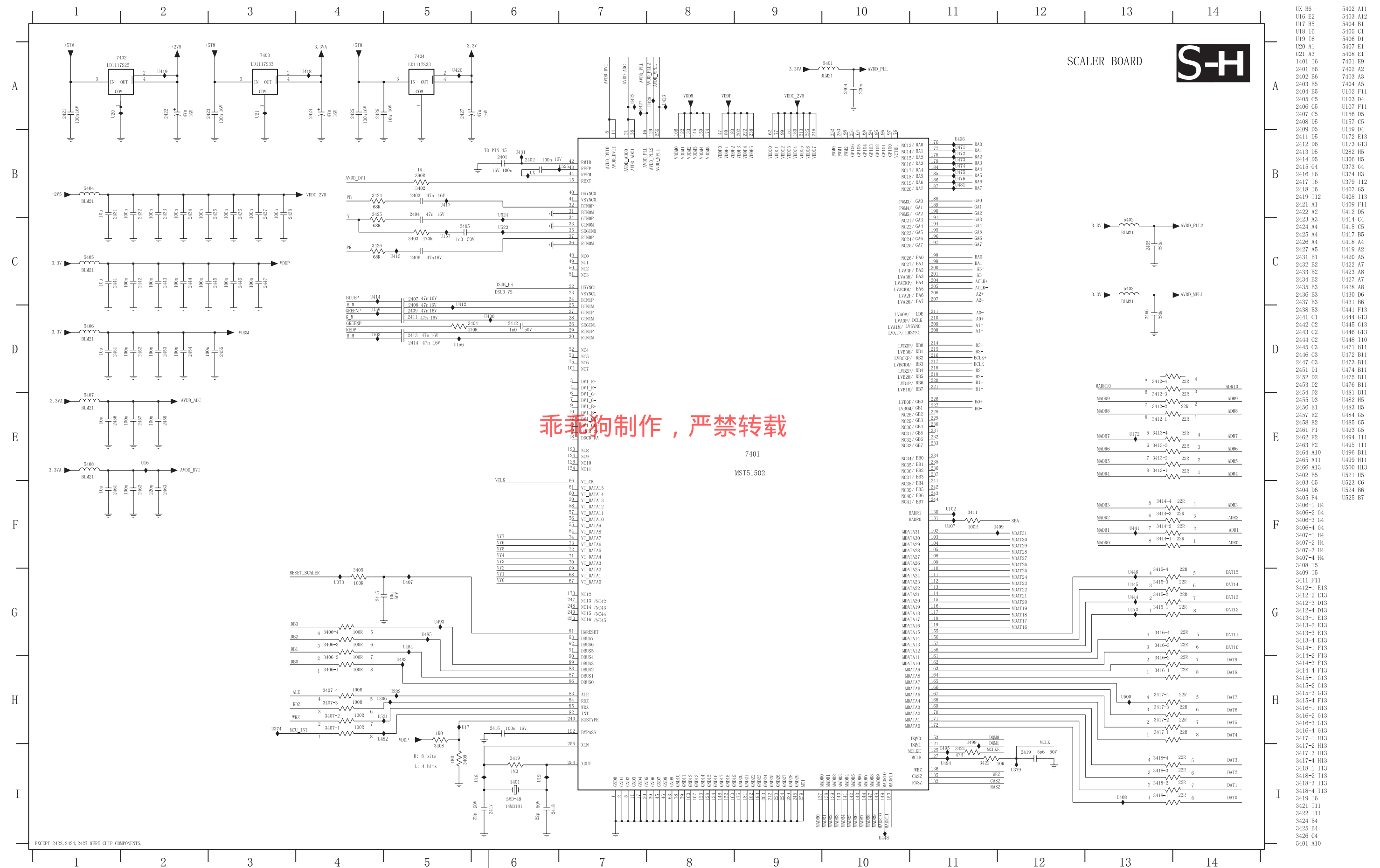
7.3.7 Scaler Schematic Diagram - MCU



U3	A7	U292	C5
U22	C1	U293	D6
1301	B6	U294	D2
1302	B1	U295	C5
1303	D1	U296	C2
1304	E7	U437	C4
1305	F7	U438	D4
1306	F7	U439	D4
1307	F8	U440	D4
1308	F8	U443	C4
2301	B2	U447	D4
2302	B2	U468	C4
2303	B6	U469	B3
2304	B6	U470	C4
2305	B7	U478	B3
2306	D6	U480	C6
2307	A4		
2308	C8		
2312	C1		
2313	D1		
2314	C1		
2317	C7		
2318	E3		
2321	F2		
2322	F2		
3301	B5		
3302	D7		
3303	C3		
3304	D3		
3305	C6		
3306	C6		
3307	C6		
3308	C6		
3309	C6		
3311	C7		
3312	C7		
3313	C8		
3314	C8		
3315	E2		
3316	E2		
3317	E3		
3323	E7		
3324	E7		
3325	E8		
3326	E8		
3327	C2		
3329	D2		
3331	C2		
5301	A4		
7301	B4		
7302	C8		
7303	A7		
7304	B1		
7305	E3		
U101	C8		
U150	C1		
U151	C1		
U152	C1		
U153	D1		
U154	C1		
U155	C1		
U158	D1		
U160	E8		
U161	E8		
U162	E7		
U163	E7		
U211	E7		
U285	E3		
U286	B5		
U287	B5		
U288	A4		
U289	C7		
U290	C8		
U291	C8		

EXCEPT 1302, 1303, 1304, 2301, 7305 WERE CHIP COMPONENTS.

7.3.8 Scaler Schematic Diagram - SCALER



E



2501 A1	U388 C8
2502 A1	U389 C8
2503 A1	U390 C8
2504 A1	U391 D5
2505 A1	U393 D4
2506 A2	U395 C5
2507 A2	U397 D8
3501-1 B2	U398 D8
3501-2 B2	U399 B7
3501-3 B2	U400 D8
3501-4 C2	U401 C8
3502 D5	U402 D8
3503 D8	U404 D8
3504-1 C2	U466 C5
3504-2 C2	U486 D1
3504-3 C2	U487 D1
3504-4 D2	U488 D1
3505-1 D2	U489 E1
3505-2 D2	U490 E1
3505-3 D2	U491 B1
3505-4 E2	U492 E1
3506-1 E2	U497 B1
3506-2 E2	U498 C1
3506-3 E2	U501 E1
3506-4 E2	
7501 D4	
7502 D7	
U323 B3	
U324 B3	
U325 B3	
U326 C3	
U327 B4	
U328 C3	
U330 D3	
U331 B4	
U332 C5	
U333 C5	
U334 C5	
U335 C5	
U336 B4	
U337 C5	
U338 D3	
U339 D3	
U340 D5	
U341 D5	
U342 D5	
U343 D5	
U344 B4	
U345 D5	
U346 C5	
U347 C5	
U348 C5	
U355 C3	
U363 C6	
U364 C6	
U366 C6	
U367 C6	
U368 C6	
U369 C6	
U370 C6	
U372 D8	
U375 D6	
U376 D6	
U377 C8	
U378 C8	
U382 C8	
U383 C8	
U384 C8	
U385 C8	
U387 C8	

7.3.10 Scaler Schematic Diagram - Panel Interface

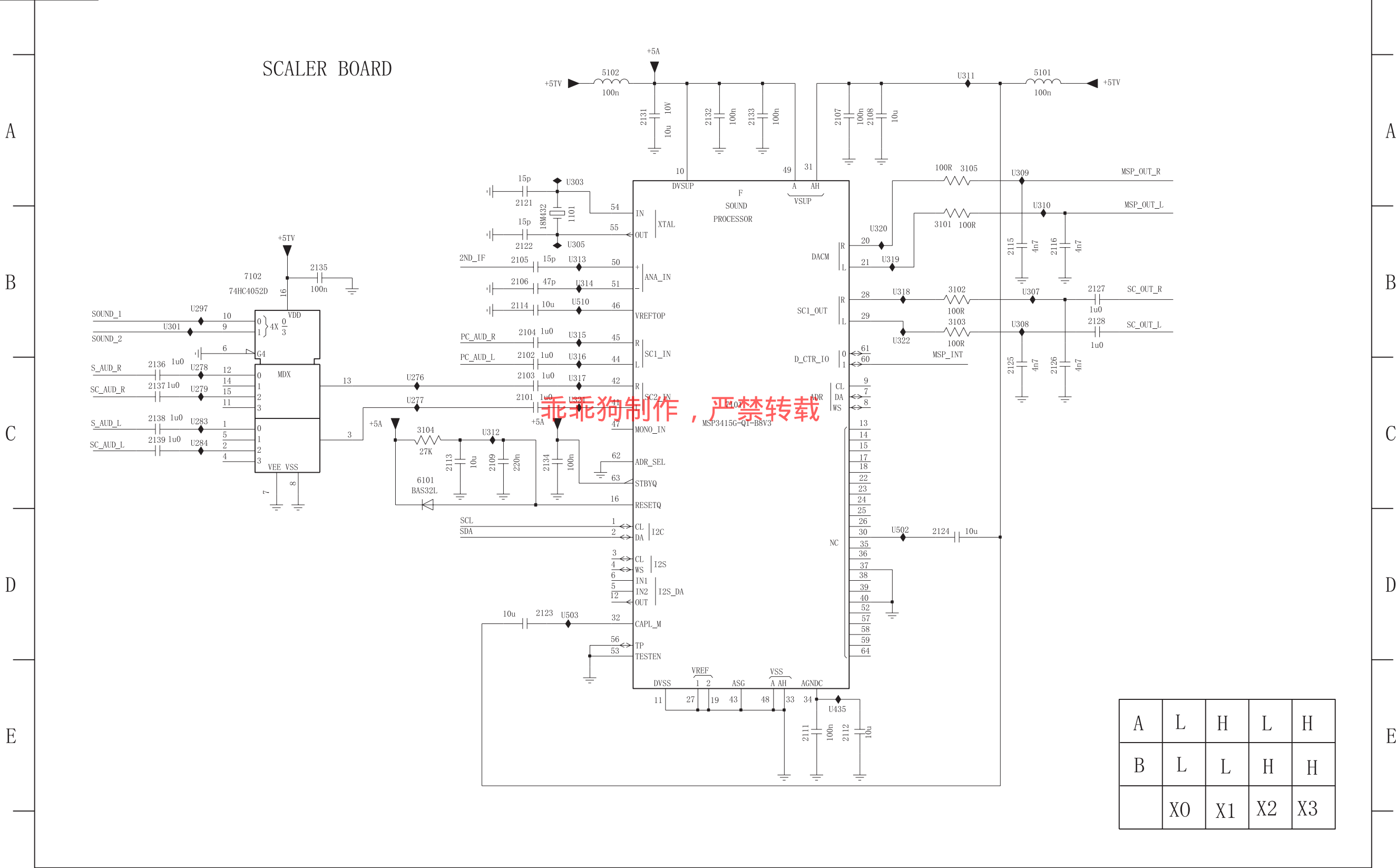


SCALER BOARD

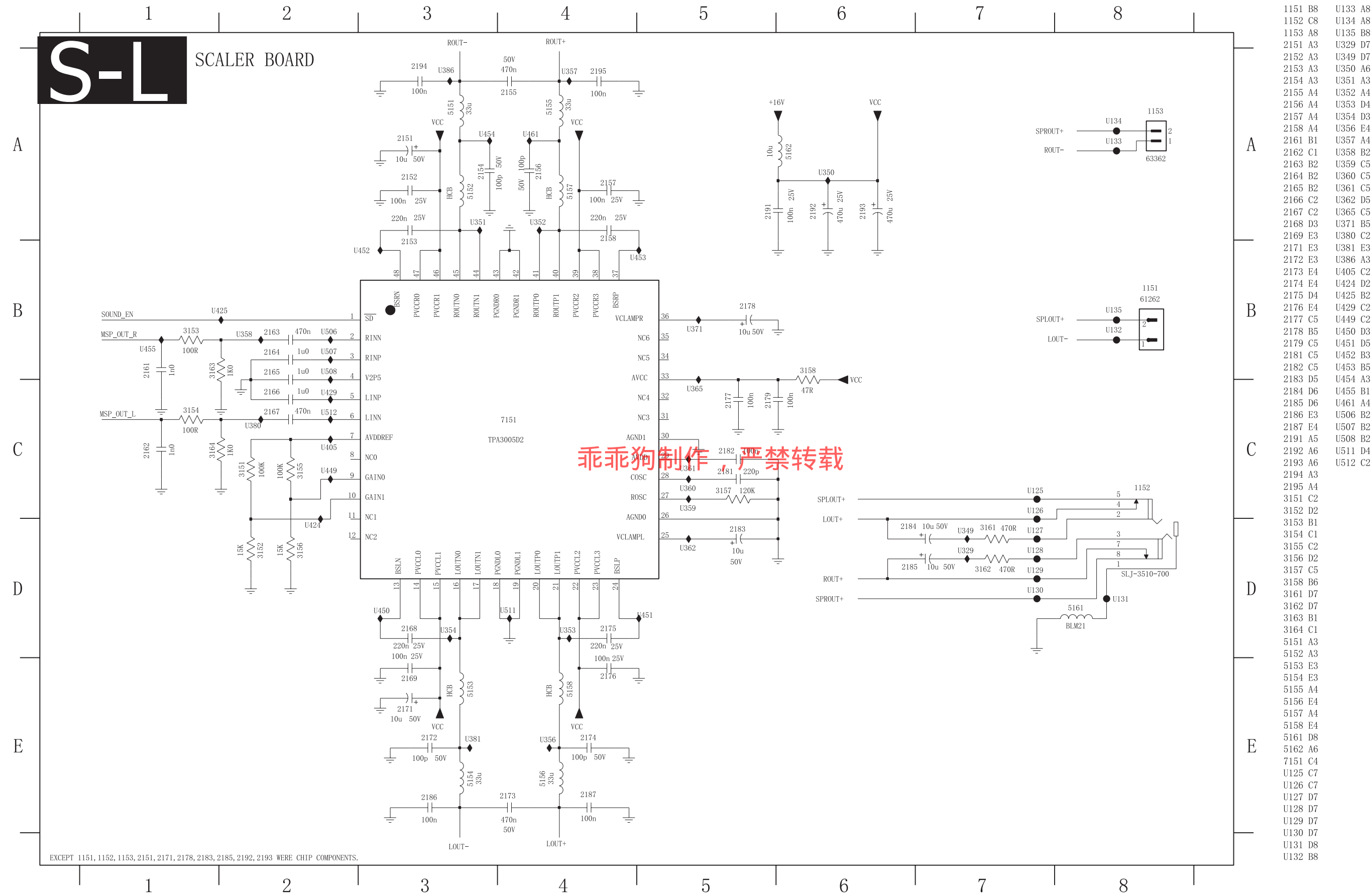
S-J

EXCEPT 2551 WERE CHIP COMPONENTS.

S-K



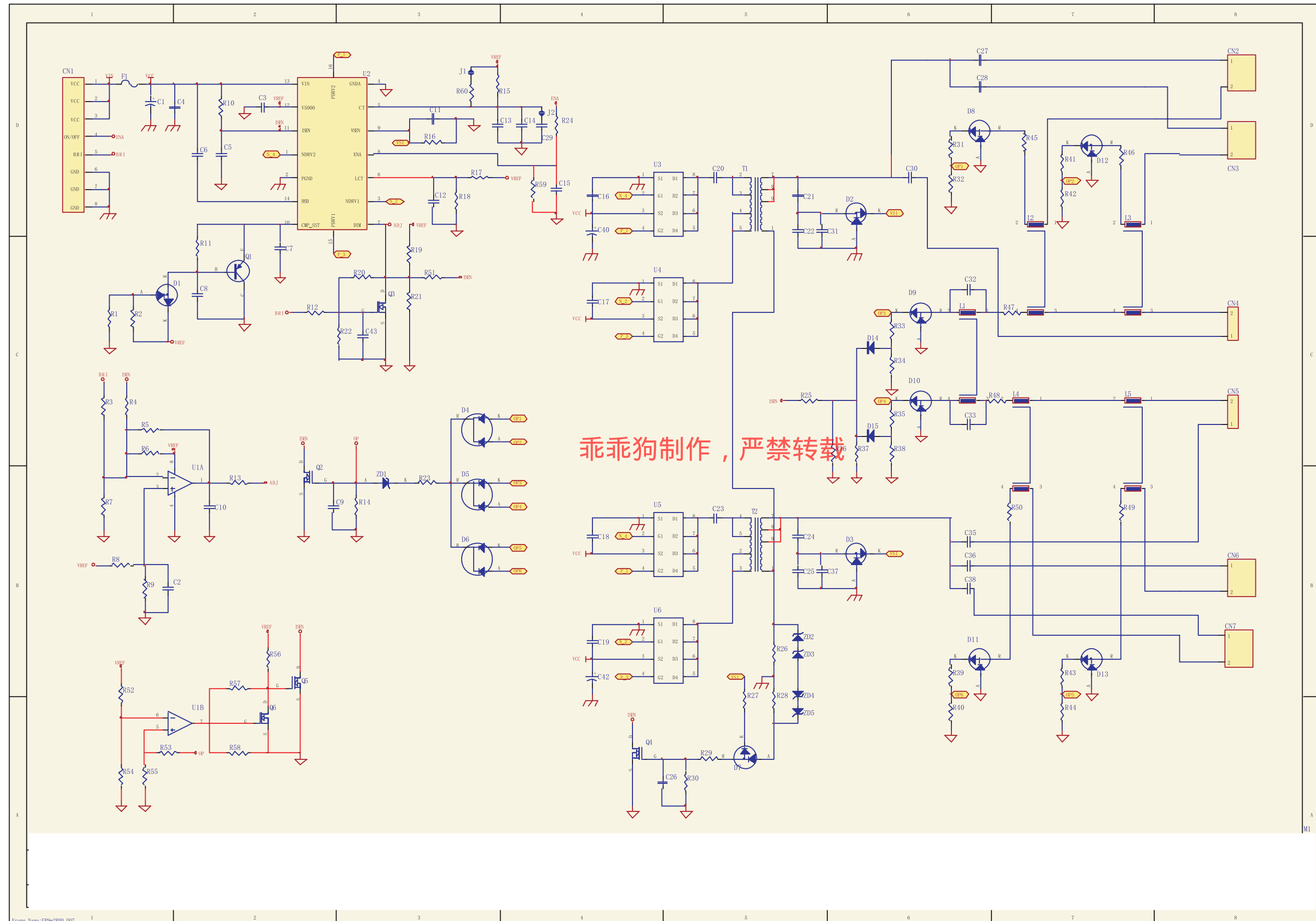
7.3.12 Scaler Schematic Diagram - AUDIO



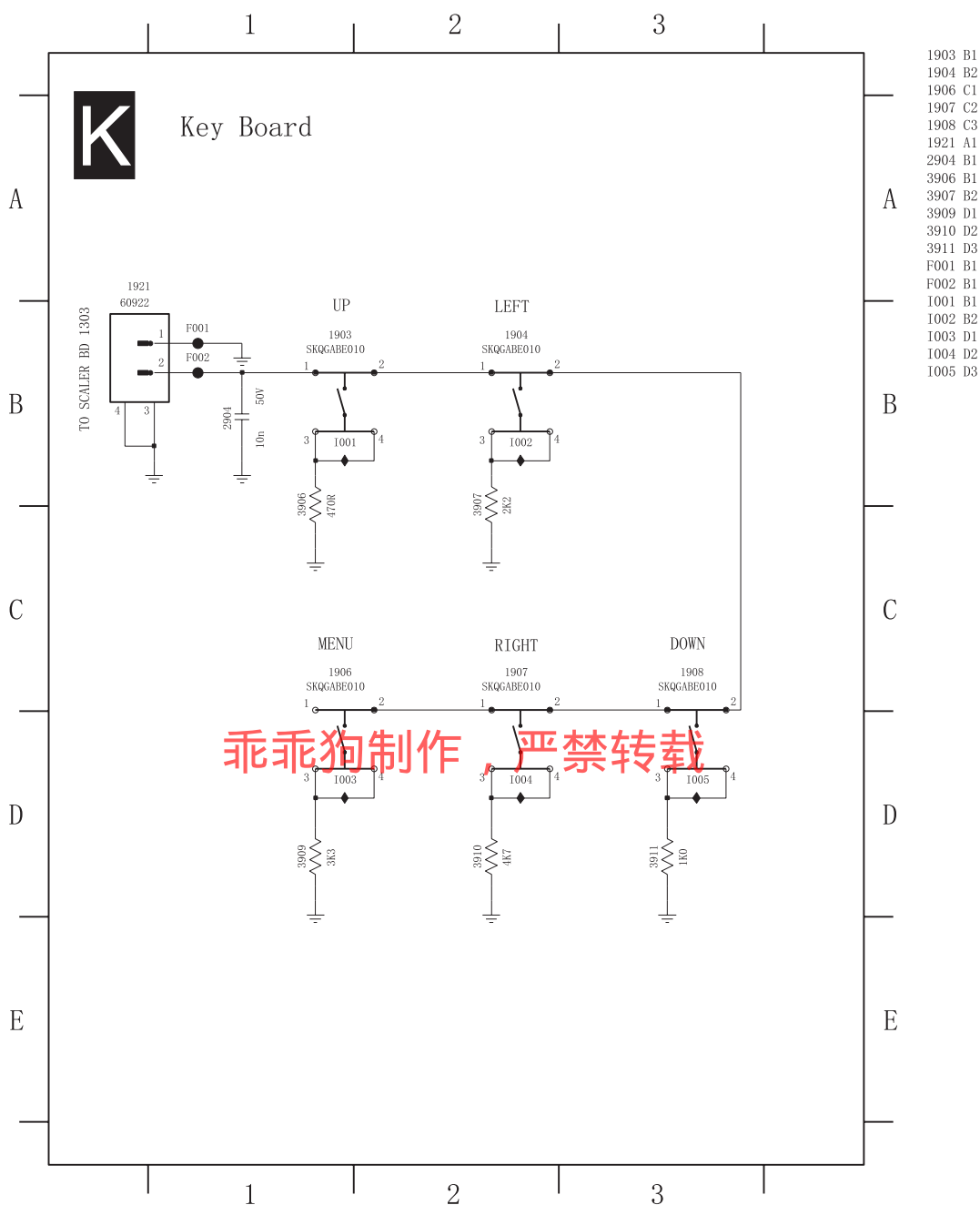
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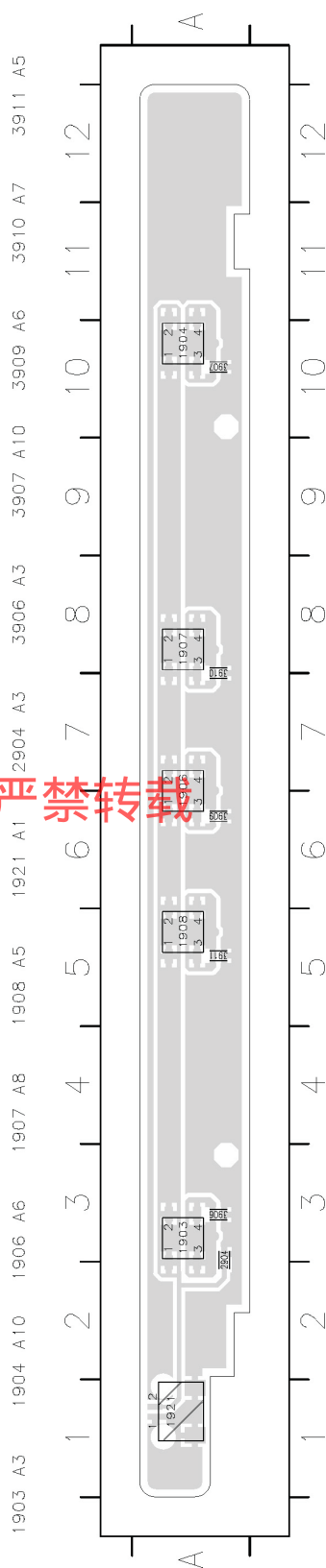
7.4.1 Inverter Schematic Diagram



7.5 Key Board Schematic Diagram

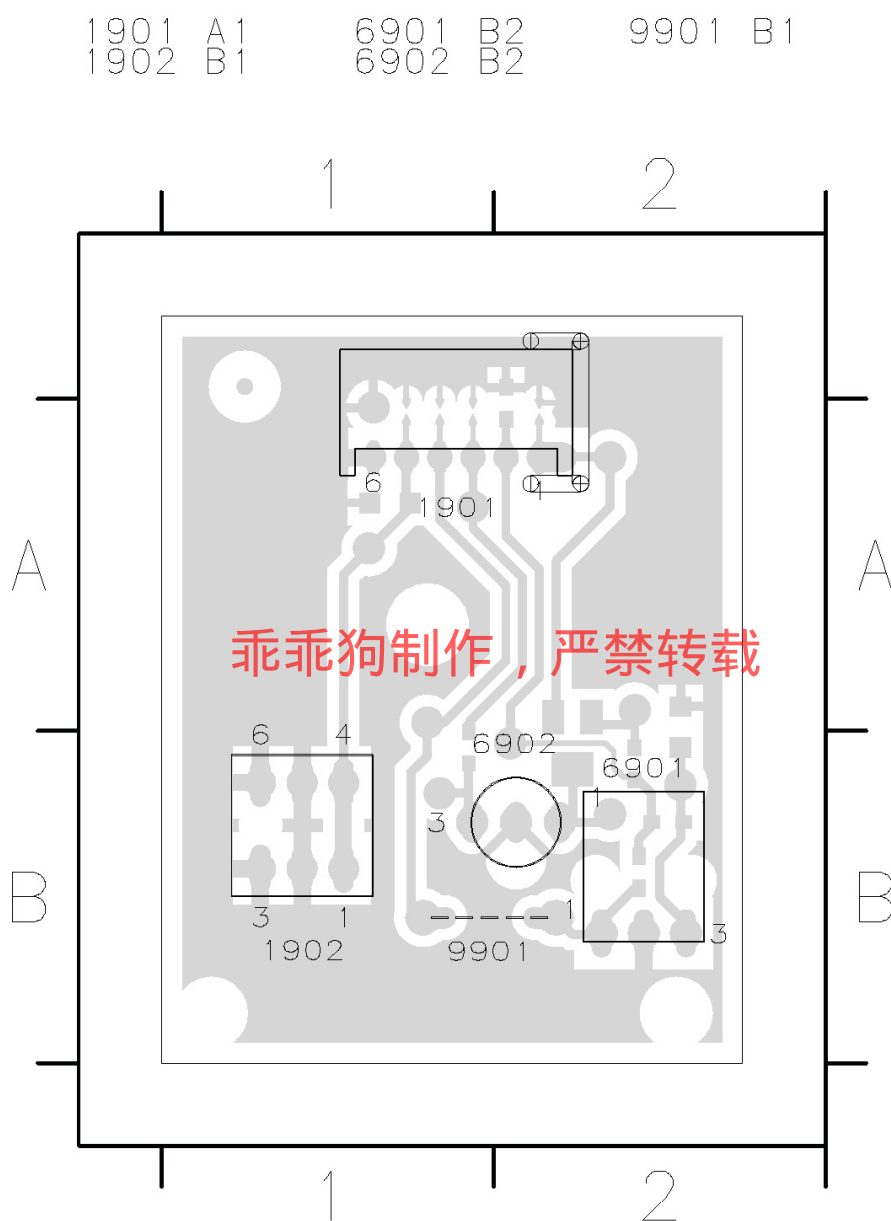




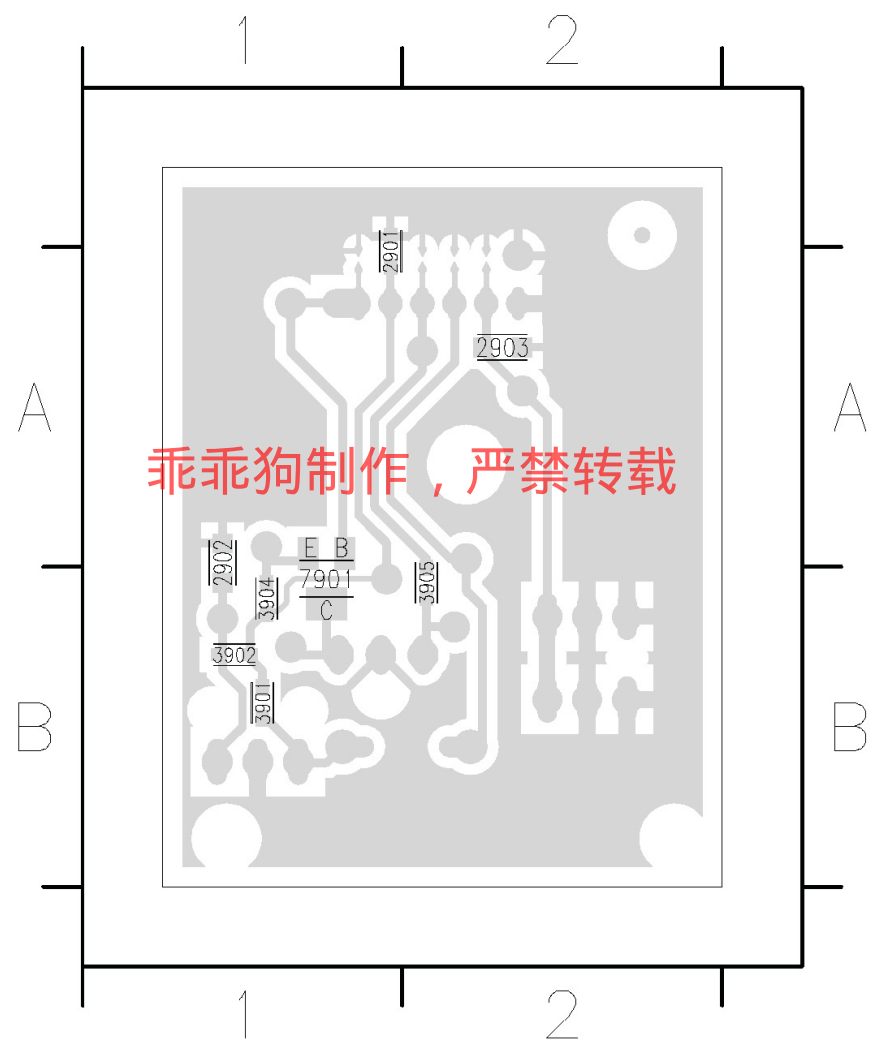


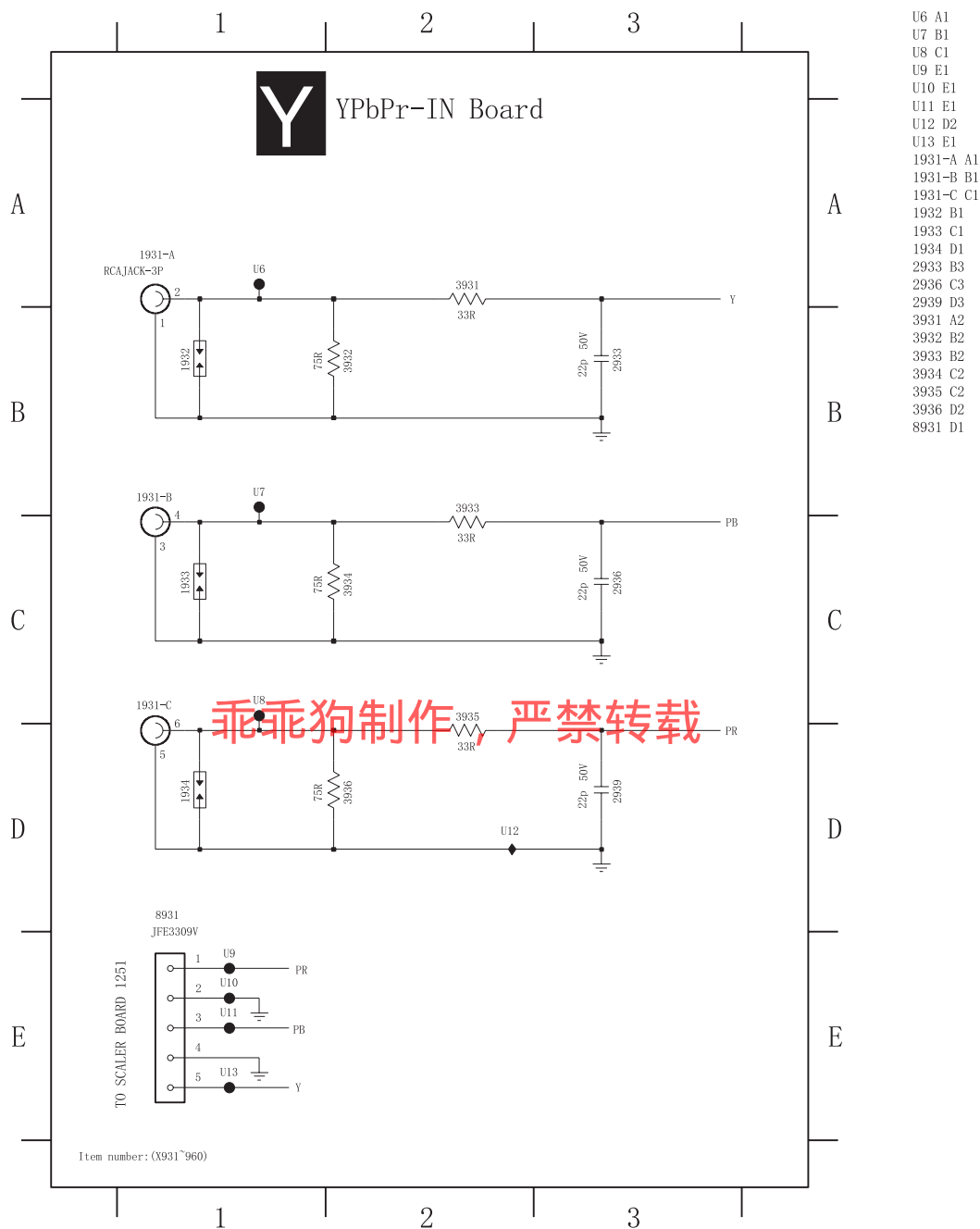
乖乖狗制作，严禁转载



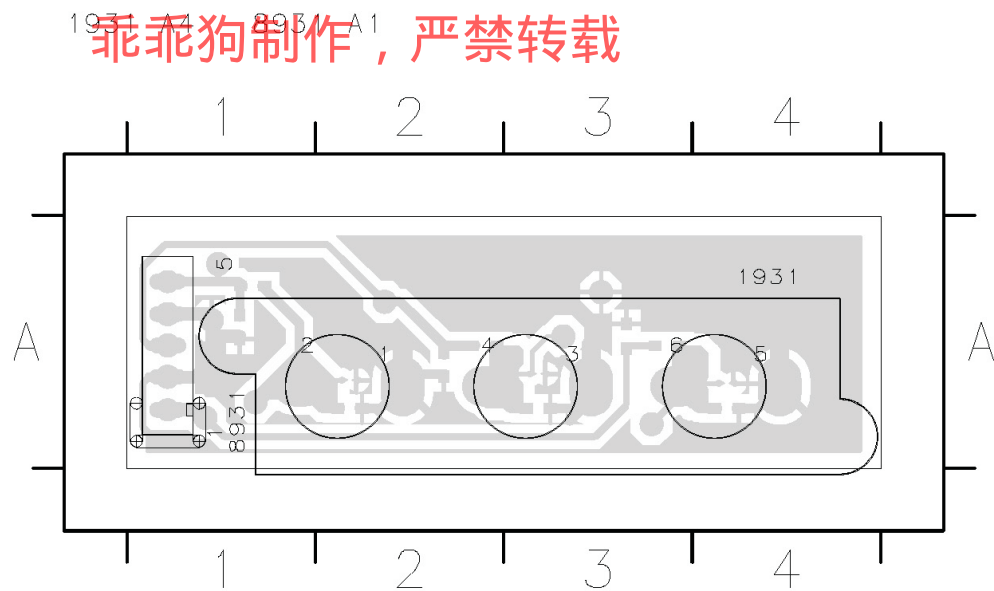


2901	A1	3901	B1	3905	B2
2902	A1	3902	B1	7901	B1
2903	A2	3904	B1		

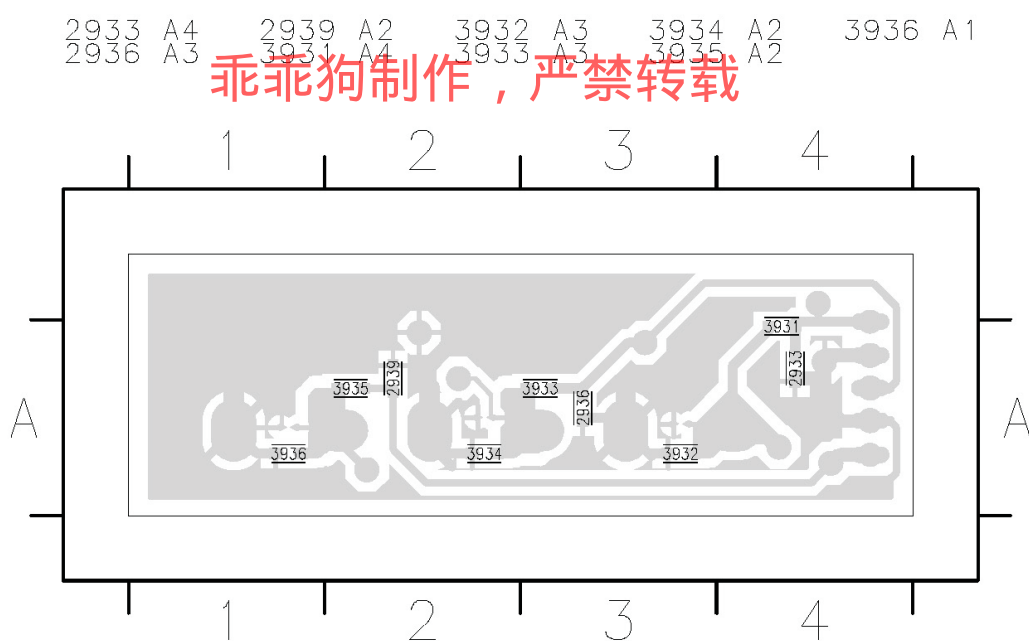




Y



7.7 YPbPr-IN PCB Layout-2



8. Alignments

- index of this chapter:
- 8.1 Electrical Instructions
 - 8.2 DDC Instructions&Serial NO. Definition
 - 8.3 DDC DATA
 - 8.4 ISP Instructions
 - 8.5 Display Adjustment

8.1 Electrical Instructions

1. General points
- 1.1 During the test and measuring, supply a distortion free AC mains Voltage to the apparatus via an isolated transformer with low internal resistance.
- 1.2 All measurements mentioned hereafter are carried out at a normal mains voltage (90 - 132 VAC for USA version, 195 -264 VAC for EUROPEAN version, or 90 - 264 VAC for the model with full range power supply, unless otherwise stated.)
- 1.3 All voltages are to be measurement or applied with respect to ground,unless otherwise stated.
Note: Don't use heat-sink as ground.
- 1.4 The test has to be done on a complete set including LCD panel in a room with temperature of 25 +/- 5 degree C.
- 1.5 All values mentioned in these test instruction are only applicable of a well aligned apparatus, with correct signal.
- 1.6 The letters symbols (B) and (S) placed behind the test instruction denotes
(B): carried out 100% inspection at assembly line
(S): carried out test by sampling
- 1.7 The white balance (color temperature), has to be tested in subdued Lighted room.
- 1.8 Repetitive power on/off cycle are allowed except it should be avoided within 6 sec.

2. Input signal

2.1.1 PC Signal type

Analog Video : 0.7 Vp-p linear, positive polarity

Separate Sync. : TTL level, separate, positive or negative polarity

Audio signal : Mini-jack audio input

Input level: 500 mVrms (Speaker output 3W when Input level > 630mVrms and Volume control at 100%)

TV Signal type

RF Signal : Aerial input, NTSC cable and antenna system.

Video signal : Cinch input, CVBS with NTSC and PAL system.
Level: 1.0Vp-p (0.7V video + 0.3V sync.)

S video input: Y/C signal, NTSC and PAL system.
Level: Y: 1.0Vp-p (0.7V video + 0.3V sync.)
C: +/- 0.3V.

Component input: Cinch G/B/R-> YPbPr cinch input.
Level: Y: 1.0Vp-p Pb/Pr: +/- 0.35V

Audio signal : Side cinch R/L for CVBS and S-video

Bottom cinch R/L for component input.

Input level: 500 mVrms (Speaker output 3W when Input level > 630mVrms and Volume control at 100%)

2.2 PC Input signal mode
PRE-LOAD VIDEO RESOLUTION

Mode 3, 6, 7 are preset modes that should pass QA inspection.
Mode 1, 2, 4, 5, 8 will run auto adjustment only, and W/O QA checking.

Dot rate (MHz)	H.freq (KHz)	Mode	Resolution	V.freq (Hz)
1 25.175	31.469	IBM VGA	640 * 350	70.087
2 28.322	31.469	IBM VGA	720 * 400	70.087
3 25.175	31.469	IBM VGA	640 * 480	59.940
4 30.240	35.000	MACINTOSH	640 * 480	66.667
5 31.500	37.500	VESA	640 * 480	75.000
6 36.000	35.156	VESA	800 * 600	56.250
7 40.000	37.879	VESA	800 * 600	60.317
8 49.500	46.875	VESA	800 * 600	75.000

2.3 TV input signal Channel and pattern for China model (1)
Signal Distribution Table (PAL D)

PRG	CH	Frequency Carriers		TV System	Pattern
		Video	Sound		
1	C 4	65.25MHz	71.75MHz	PAL D (CCIR)	Full Write
2	E 7	184.25MHz	190.75MHz	PAL D (CCIR)	Circle Pattern
3	E 12	224.25MHz	230.75MHz	PAL D (CCIR)	Color Bar
4	K 21	471.25MHz	477.75MHz	PAL D (CCIR)	Full Write
5	G 34	511.25MHz	517.75MHz	PAL D (CCIR)	Circle Pattern
6	G 62	547.25MHz	553.75MHz	PAL D (CCIR)	Color Bar
7	M 58	551.25MHz	557.75MHz	PAL D (CCIR)	Crosshatch
8	G 47	615.25MHz	621.75MHz	PAL D (CCIR)	Color Bar

Table 1

3. TV mode display adjustment

3.1 White balance adjustment (B)

General set-up :

Equipment Requirements: Color analyzer.

Input requirements:

Input Signal Type : CVBS-PAL signal.

Frequency = 65.25 MHz (for China model).

Alignment method:

Initial Set-up : Set TV (7119) Brightness=120;

Contrast=70, Saturate=73,Tint=24 in

factory mode (can be fine tuned)

Set Smart picture as "PERSONAL" (Brightness=50,

Color=50, Contrast=50)

Apply "100IRE (100%) Full White" pattern by TV pattern generator.

Alignment: Adjust the VIDEO SCALER GAIN R G B in Factory Mode
For "NORMAL", "COOL" and "WARM". (See Fig 1.)

[Enter factory menu : press "Volume -" and "Menu" keys together
around six seconds]

Keep R=121 for the adjustment of "NORMAL", "COOL" and "WARM".

The 1931 CIE chromaticity (X, Y) co-ordinates shall be:

Picture Mode	x	y
Normal	0.287 ± 0.005	0.287 ± 0.005
Cool	0.275± 0.005	0.270± 0.005
Warm	0.315± 0.005	0.310± 0.005

Table 3.1: Readings with Minolta CA-110.

FACTORY ADJUST MENU

NORMAL

SCALER GAIN	R	G	B
AUTO-COLOR (OK)			
ADC OFFSET	R	G	B
ADC GAIN	R	G	B
PC OFFSET	R	G	B
7119 SDTV	?	SAT	TINT
TV SHIFT	H	V	
HD SHIFT	H	V	
RESERVE			
HDTV ADC OFFSET	R	G	B
HDTV ADC GAIN	R	G	B
VIDEO SCALER GAIN	R	G	B
SCALER HUE			
EXIT			Value

Fig-1

4. PC mode display adjustment

4.1 Display quality adjustment

Use timing mode as describe in 2.2, and use the POPO (pixel on pixel off) pattern to adjust the clock until no stripe and adjust the phase until clear picture.

(AUTO ADJUST hot key: press "Volume-" and "Menu" keys together for 1 second.)

Check the 3 preset modes.

4.2 WHITE-D adjustment (B)

4.2.1 At factory mode apply 800x600/60Hz mode with 64 gray pattern.

Set main controls brightness control at 50% and contrast to 50% .

Select AUTO-COLOR function for ADC OFFSET and ADC GAIN setup.

4.2.2 Set SCALER GAIN R G B of "NORMAL" "COOL" and "WARM" as:

Gains	NORMAL	COOL	WARM
R	127	119	128
G	118	109	111
B	114	112	91

4.3

Check the analog interface cable

Check the color poor & noise condition of 64-gray pattern.

5. HD mode display adjustment

5.1 White balance adjustment (B)

General set-up:

Equipment : Quantum Data Pattern Generator 801GD or 802G.

Apply 1080i, RGBW gray pattern.



(Or FLUKE 54200, apply 576i, DIGITAL SCAN/DIGI_ADC1 pattern.)



Alignment method:

Initial Set-up: Set SA7119 as, Brightness=120; Saturation=70; Contrast=73; Tint=24

Set Smart picture as "Personal", "Brightness=50, Color=50, Contrast=50
Set AUTO-COLOR process.

Alignments: Make the VIDEO SCALER GAIN R G B same as TV mode.
Check chromaticity (X, Y) co-ordinates specification:

Picture Mode	x	y
Personal/Normal	0.287 ± 0.015	0.287 ± 0.015

If out of specification, fine-tune HDTV ADC GAIN in factory mode

6. Preset EEPROM data

6.1 EEPROM data has to be preset data according following table.

Factory mode preset.

Function	Preset value		
SCALER GAIN	PC Normal	127 118 114	
	PC Cool	119 109 112	
	PC Warm	128 111 91	
ADC Offset R/G/B		127	127 127
ADC Gain R/G/B		127	127 127
PC OFFset R/G/B		127	127 127
7119 brightness	120 (RF)	120(AV/SVHS/HD)	
7119 Saturation	75 (RF)	70(AV/SVHS/HD)	
7119 contrast	75 (RF)	73(AV/SVHS/HD)	
7119 TINT	24 (RF)	24(AV/SVHS/HD)	
		NTSC	PAL
TV shift H	Regular	146	162
TV shift V		9	14
HD SHIFT H		#	#
HD SHIFT V		#	#
HD ADC OFFset R G B		127	127 127
HD ADC GAIN R G B		127	127 127
Video Scaler Gain		127	127 127
Scaler Hue		50	

Factory mode:

	480I	480P	576i	576P	720P /50Hz	720P /60Hz	1080i /50Hz	1080i /60Hz
HD shift H	155	155	166	165	107	104	207	206
HD shift V	39	40	50	52	43	43	63	64

6.2 Smart picture &Smart sound:

6.2.1 Final TV mode out box setting.

RF channel: Channel 1

Format: 4:3

Language: Chinese

Smart picture: RICH(Cool)

Smart Picture

RF	RICH	NATURE	SOFT	MULTMEDIA	PERSONAL
Brightness	43	40	39	50	50
Color	60	57	52	70	50
Contrast	60	50	45	56	50
Sharpness	41	33	29	50	50

AV/S-Video	RICH	NATURE	SOFT	MULTMEDIA	PERSONAL
Brightness	40	38	35	45	50
Color	52	54	49	63	50
Contrast	60	52	45	60	50
Sharpness	75	58	50	70	50

HD(YPbPr)	RICH	NATURE	SOFT	MULTMEDIA	PERSONAL
Brightness	48	40	30	46	50
Color	75	70	55	80	50
Contrast	60	57	57	67	50
Sharpness	79	58	58	87	50

Smart Sound

PERSONAL	TREBLE	50
	BASS	50
	BALANCE	0
VOICE	TREBLE	60
	BASS	60
	BALANCE	0
THEATRER	TREBLE	90
	BASS	95
	BALANCE	0
MUSIC	TREBLE	78
	BASS	83
	BALANCE	0

Smart Sound : THEATRER

Sound volume :20

Incredible surround: OFF

AVL : OFF

8.2 DDC Instructions&Serial NO. Definition

Note: The alignment box has already build-in a batteries socket for using batteries (8~12V) as power source. Pull out the socket by remove four screws at the rear of box. Please do not forget that remove batteries after programming. The energy of batteries can only drive circuits for a short period of time.

General

DDC Data Re-programming
In case the DDC data memory IC or main EEPROM which storage all factory settings were replaced due to a defect, the serial numbers have to be re-programmed "Analog DDC IC, Digital DDC IC & EEPROM". It is advised to re-soldered DDC IC and main EEPROM from the old board onto the new board if circuit board have been replaced, in this case the DDC data does not need to be re-programmed.

Additional information
Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA). Extended Display Identification Data(EDID) information may be also obtained from VESA.

System and equipment requirements

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98 .
You have to Install the EDID_PORT_Tool under Win2000/XP . As Fig. 1 .

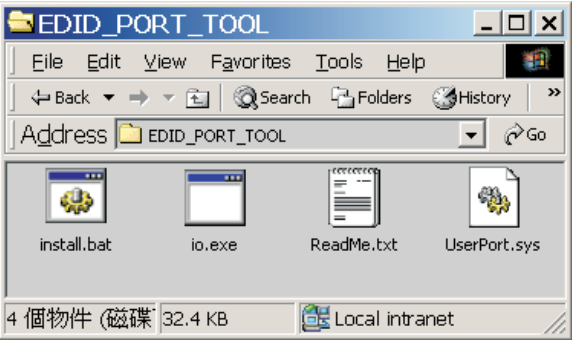


Fig.1

Pin assignment

A. 15-pin D-Sub Connector

PIN No.	SIGNAL
1	Red
2	Green
3	Blue
4	GND
5	GND
6	Red GND
7	Green GND
8	Blue GND
9	+5V (Supply from PC)
10	Sync GND
11	GND
12	Bi-directional data
13	H-sync
14	V-sync
15	Data clock

A. Cody the "UserPort.sys" to C:\WINNT\system32\drivers(win2000)

C:\WINDOWS\system32\drivers(winXP)

B. Running " io.exe" everytime, Before you start to programming edid data .

3. EDID46.EXE program
4. A/D Alignment kits (12NC: 3138 106 10396):
inclusion : a. Alignment box x1 (Fig. 2)



Fig. 2

- b. Printer cable x1
- c. (D-Sub) to (D-Sub) cable x1

Configuration and procedure

There is no Hardware DDC (DDC IC) anymore. Main EEPROM stores all factory settings and DDC data (EDID code) which is also called Software DDC. The following section describes the connection and procedure for Software DDC application. The main EEPROM can be re-programmed by enabling "factory memory data write" function on the DDC program (EDID46.EXE).

Initialize alignment box

In order to avoid that monitor entering power saving mode due to sync will cut off by alignment box, it is necessary to initialize alignment box before running programming software (EDID46.EXE). Following steps show you the procedures and connection.

- Step 1: Supply 8-12V DC power source to the Alignment box by plugging a DC power cord .
- Step 2: Connecting printer cable and D-Sub cable of monitor as Fig. 4

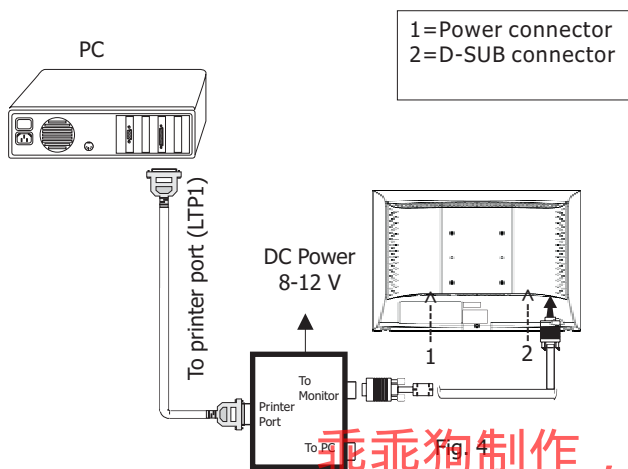


Fig. 4

Step 3: Installation of EDID46.EXE

Method 1: Start on DDC program

Start Microsoft Windows.

1. The Program"EDID46.EXE" in service manual cd-rom be copied to C:\.
2. Click Start , choose Run at start menu of Windows as shown In Fig. 5.

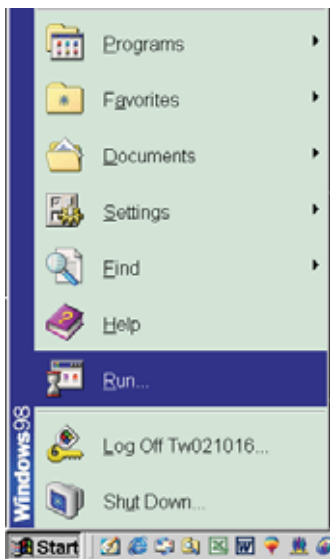


Fig. 5

3. At the submenu, type the letter of your computer's hard disk drive followed by :EDID46 (for example, C:\EDID46, as shown in Fig. 6).

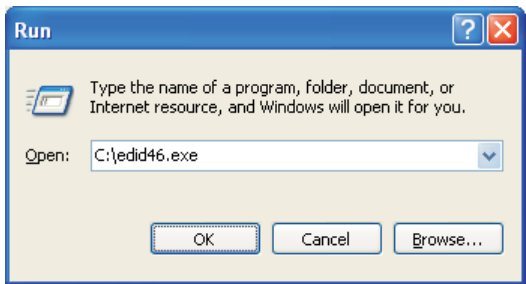


Fig. 6

4. Click OK button. The main menu appears (as shown in Fig. 7). This is for initialize alignment box.



Fig. 7

Note 1: If the connection is improper, you will see the following error message (as shown in Fig. 8) before entering the main menu. Meanwhile, the (read EDID) function will be disable. At this time, please make sure all cables are connected correctly and fixedly, and the procedure has been performed properly.



Fig. 8

Note 2: During the loading, EDID46 will verify the EDID data which just loaded from monitor before proceed any further function, once the data structure of EDID can not be recognized, the following error message will appear on the screen as below. Please confirm following steps to avoid this message.

1. The data structure of EDID was incorrect.
2. DDC IC that you are trying to load data is empty.
3. Wrong communication channel has set at configuration setup windows.
4. Cables loosed or poor contact of connection.



Fig. 9

Re-programming Analog DDC IC

Step 1: After initialize alignment box, connecting all cables and box as shown in Fig. 10.

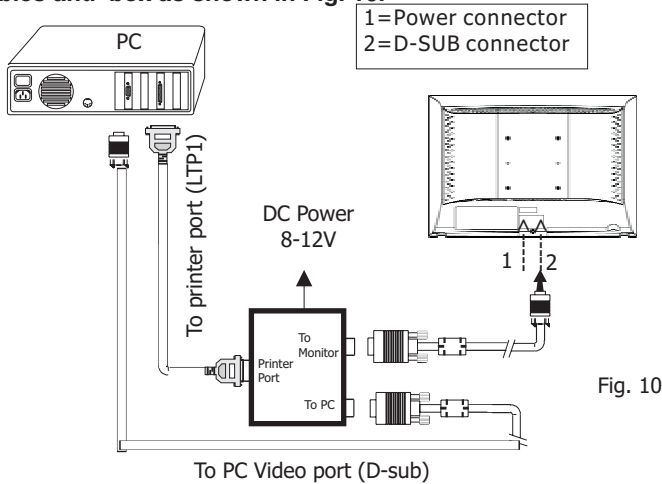



Fig. 10

Step 2: Read DDC data from monitor

- Click  icon as shown in Fig. 11 from the tool bar to bring up the Channels "Configuration Setup" windows as shown in Fig. 11.

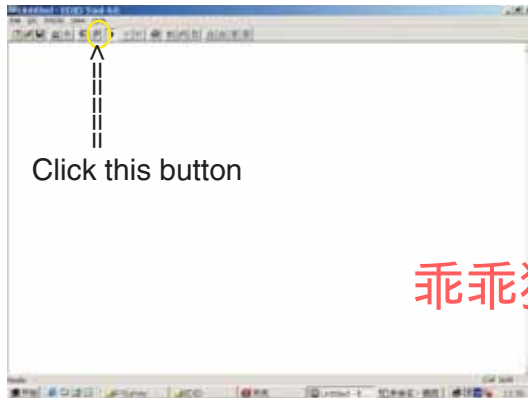



Fig. 11

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- Select the DDC2Bi as the communication channel. As shown in Fig. 12.



Fig. 12

- Click OK button to confirm your selection.
- Click  icon (Read EDID function) to read DDC EDID data from monitor. The EDID codes will display on screen as shown in Fig. 13.

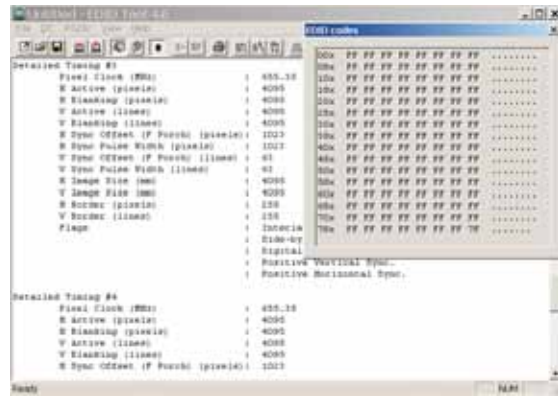



Fig. 13

Step 3: Modify DDC data (verify EDID version, week, year)

- Click  (new function) icon from the tool bar, bring up Step 1 of 9 as shown in Fig. 14.

EDID46 DDC application provides the function selection and text change (select & fill out) from Step 1 to Step 9.



Fig. 14

Step 4: Modify DDC data (Monitor Serial No.)

- Click Next, bring up Fig. 15.

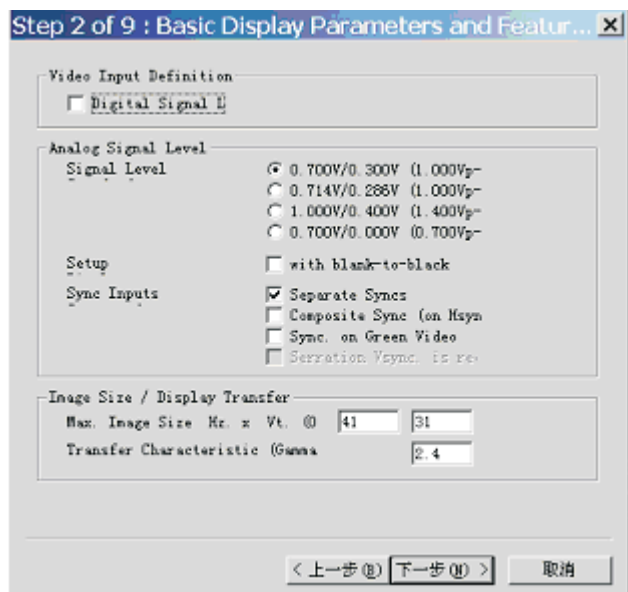


Fig. 15

2. Click Next , bring up Fig.16.

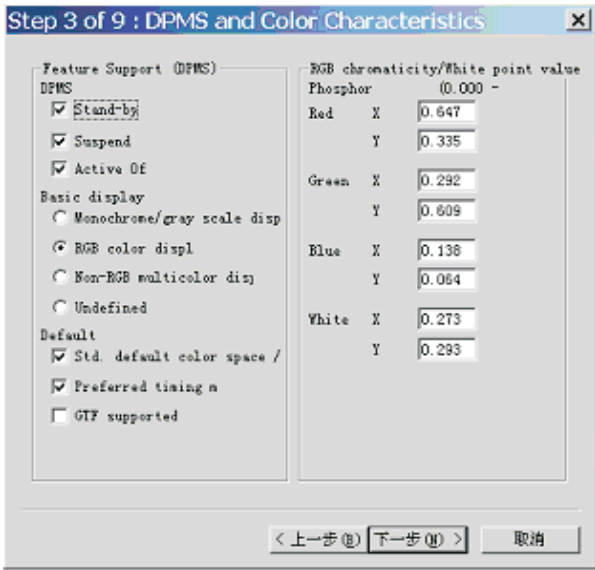


Fig. 16

3. Click Next , bring up Fig.17.



Fig. 17

4. Click Next , bring up Fig.18.

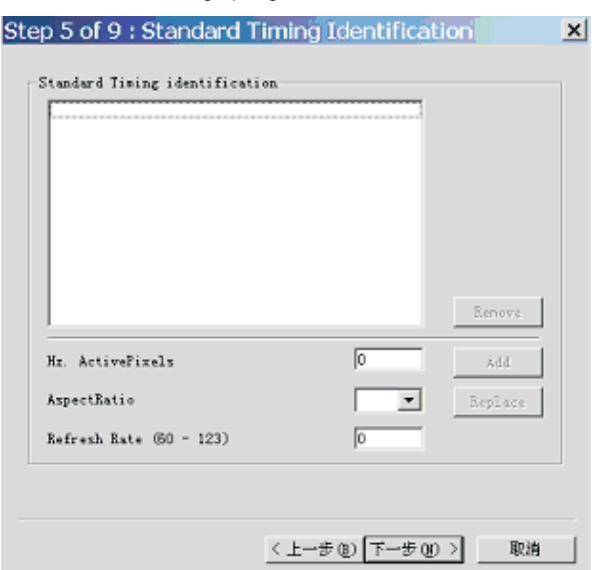


Fig. 18

5. Click Next , bring up Fig.19.

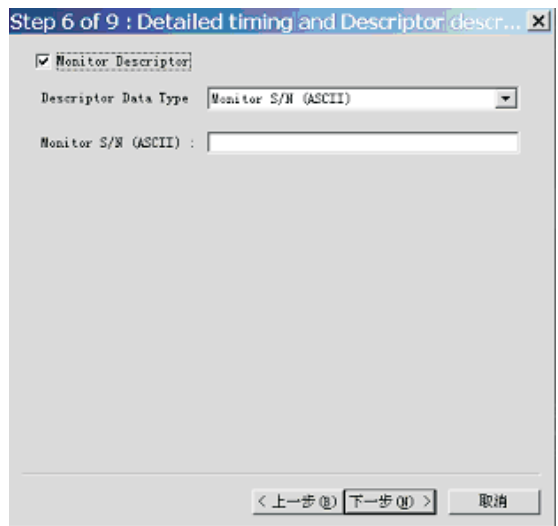


Fig. 19

6. Click Next , bring up Fig. 20.
In this step, you can modify the SN as below.



Fig. 20

7. Click Next , bring up Fig. 21.

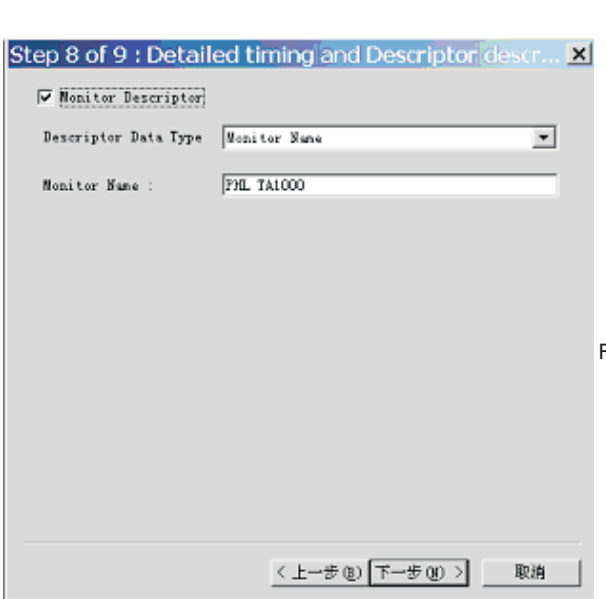


Fig. 21

8. Click Next , bring up Fig. 22.
 - Click Finish to exit the Step window.
 - Serial number can be filled up at this moment (for example, 923418).

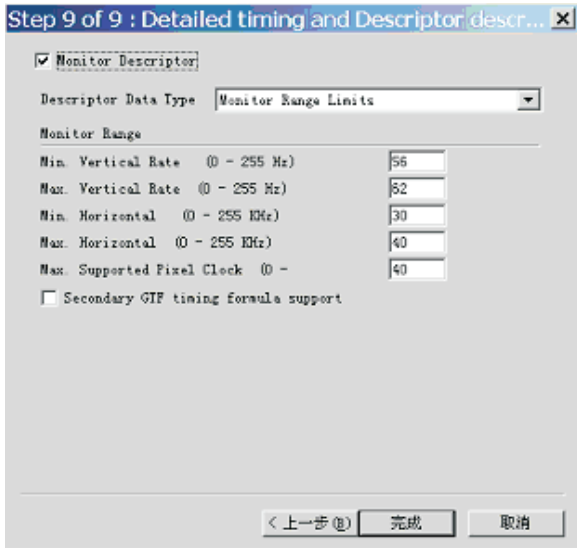


Fig. 22

Step 5: Write DDC data

1. Configuration should be as Fig. 23. And press OK.

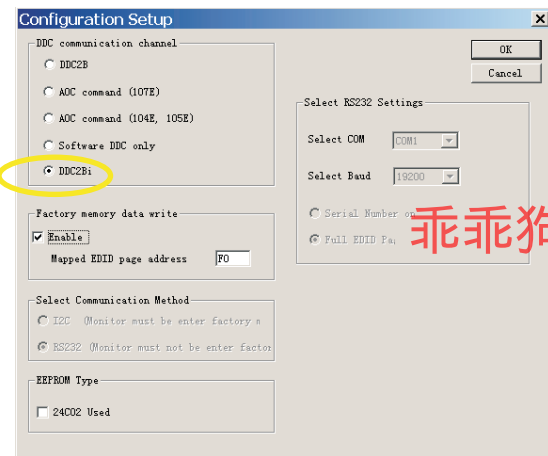


Fig. 23

2. Access Factory Mode

- 1). Turn off monitor.
- 2). Press power "⏻" button. Then quickly push " + " and " - " of Volume ,and hold this two buttons , then the screen comes out "Waiting For Automatic Adjustment ",then the screen will be black for one second untill comes out "Windows screen"] => then release this two buttons.
- 3). Press "MENU" button, wait until the OSD menu appears (See Fig. 24).

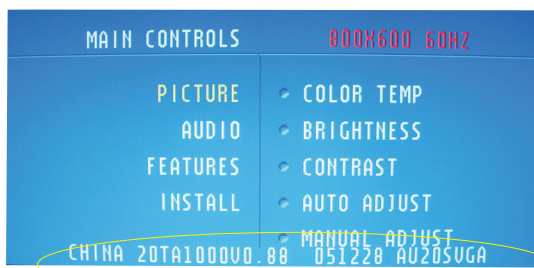



Fig. 24


Factory Mode Indicator

- 3) Push "Menu" to exit OSD menu.

- 4). Click  (Write EDID) icon from the tool bar to write DDC data. wait for 5 seconds ,DDC data will be finished Writing.

Step 6: Save DDC data

Sometimes, you may need to save DDC data as a text file for using in other IC chip. To save DDC data, follow the steps below:

1. Click  (Save) icon (or click "file"-> "save as") from the tool bar and give a file name as shown in Fig. 25.

The file type is EDID46 file (*.ddc) which can be open in WordPad. By using WordPad, the texts of DDC data & table (128 bytes, hex code) can be modified. If DDC TEXTS & HEX Table are completely correct, it can be saved as .ddc file to re-load it into DDC IC for DDC Data application.

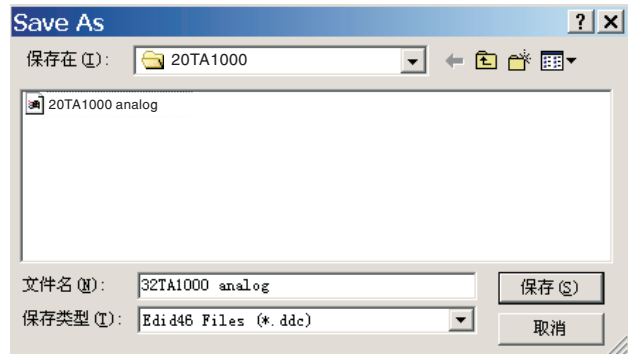


Fig. 25

2. Click Save.

Step 7: Exit DDC program

Pull down the File menu and select Exit as shown in Fig. 26.

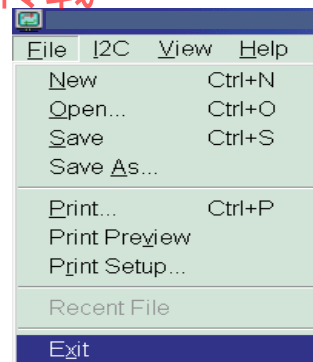


Fig. 26

Step 8: Turn off the monitor, exit the factory mode.

Serial NO. definition

SERIAL NUMBER: BZ1A0525000001

Code 39 : BZ1A0525000001

- Serial number (6 digits)
- Production year/week code
- Service version change code
- BOM (bill of Material) code
- Sit code (Production center) according BZ CODE (BZ-SUZHOU, DS-DONG GUAN, VN-HUNGARY(SZR))

BOM Code:

PANEL SUPPLIER	CODE
AU	1
CPT	2
LPL(LG)	3
QDI	4

8.3 DDC DATA

Display data channel : DDC2B

DDC DATA

Use a computer with DDC communication capability to read the DDC2B display identification data from the monitor.

AUO panel:

EDID log file

Vendor/Product Identification

ID Manufacturer Name : PHL
ID Product Code : 4650 (HEX.)
ID Serial Number : 1010101 (HEX.)
Week of Manufacture : 39
Year of Manufacture : 2005

EDID Version, Revision

Version : 1
Revision : 3

Basic Display Parameters/Features

Video Input Definition : Analog Video Input
0.700V/0.300V (1.00Vpp)
without Blank-to-Black Setup
Separate Sync
without Composite Sync
without Sync on Green
no Serration required

Maximum H Image Size : 41
Maximum V Image Size : 31

Display Transfer Characteristic : 2.4
(gamma)

Feature Support (DPMS) : Standby
Suspend
Active Off

Display Type : RGB color display
Standard Default Color Space : Primary color space
Preferred Timing Mode : Detailed timing block 1

Color Characteristics

Red X coordinate : 0.647

Red Y coordinate : 0.335

Green X coordinate : 0.292
Green Y coordinate : 0.609
Blue X coordinate : 0.138
Blue Y coordinate : 0.064
White X coordinate : 0.273
White Y coordinate : 0.293

Established Timings

Established Timings I : 640 x 480 @60Hz (IBM,VGA)
800 x 600 @56Hz (VESA)
800 x 600 @60Hz (VESA)

Established Timings II :

Manufacturer's timings :

Standard Timing Identification : Unused

Monitor Descriptor #1

Serial Number :

Monitor Descriptor #2

Serial Number :

Monitor Descriptor #3

Monitor Name : PHL TA1000

Monitor Descriptor #4

Monitor Range Limits

Min. Vt rate Hz : 56
Max. Vt rate Hz : 62
Min. Horiz. rate kHz : 30
Max. Horiz. rate kHz : 40
Max. Supported Pixel : 40

No secondary GTF timing formula supported.

Extension Flag : 0

Check sum : AF (HEX.)

EDID data (128 bytes)

0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00
8: 41 9: 0c 10: 50 11: 46 12: 01 13: 01 14: 01 15: 01
16: 27 17: 0f 18: 01 19: 03 20: 08 21: 29 22: 1f 23: 8c
24: ee 25: fc 26: 60 27: a5 28: 55 29: 4a 30: 9c 31: 23
32: 10 33: 46 34: 4b 35: 23 36: 00 37: 00 38: 01 39: 01
40: 01 41: 01 42: 01 43: 01 44: 01 45: 01 46: 01 47: 01
48: 01 49: 01 50: 01 51: 01 52: 01 53: 01 54: 00 55: 00
56: 00 57: ff 58: 00 59: 0a 60: 20 61: 20 62: 20 63: 20
64: 20 65: 20 66: 20 67: 20 68: 20 69: 20 70: 20 71: 20
72: 00 73: 00 74: 00 75: ff 76: 00 77: 0a 78: 20 79: 20
80: 20 81: 20 82: 20 83: 20 84: 20 85: 20 86: 20 87: 20
88: 20 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50
96: 48 97: 4c 98: 20 99: 54 100: 41 101: 31 102: 30 103: 30
104: 30 105: 0a 106: 20 107: 20 108: 00 109: 00 110: 00 111: fd
112: 00 113: 38 114: 3e 115: 1e 116: 28 117: 04 118: 00 119: 0a
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: af

8.4 ISP Instructions

Configuration and procedure

"Easywriter " The software is provided by Novatek to upgrade the firmware of CPU.

It is a windows-based program, which cannot be run in MS-DOS.
DDC2BI_ISP TOOL (3138 149 53161) is for the interface between "Parallel Port of PC" and "15 pin-D-SUB connector of Monitor".

System and equipment requirements

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98/2000/XP.
3. ISP Software " Easywrite "
4. DDC2BI_ISP TOOL (3138 106 10396) as shown in Fig. 1



Fig. 4

Step 5 :Copy the hex code to C:\Ta1000 as shown in Fig. 5 .



Fig. 5

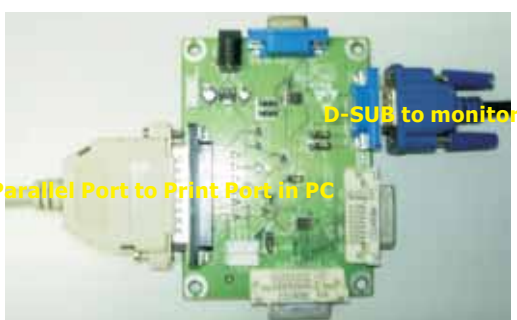


Fig. 1

5. Connect DDC2BI_ISP TOOL and Mains cord to Monitor as shown in Fig. 2.

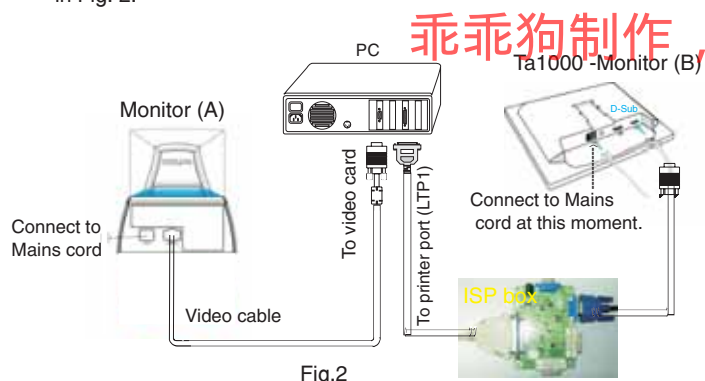


Fig.2

6. Install and setup the Easywriter program

Step 1 : Make a folder in your PC as shown in Fig. 3.

For example : C:\Ta1000

Step 2 : Copy ISP Software Easywriter.zip into your folder as shown in Fig.3.

Step 3 : Unzip Easywriter.zip into your folder as shown in Fig. 3.

Step 4 : Double click the EasywriterV2.09a_user.exe icon to install the Application as Fig. 4.

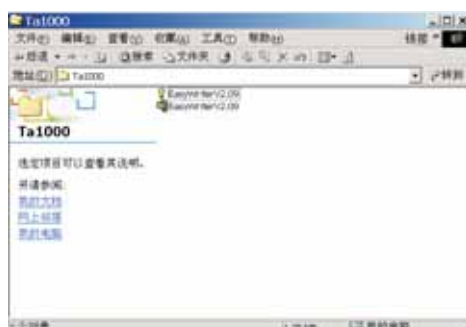


Fig. 3

Update the firmware

1. Double click the Easywriter.exe icon in desktop then appears window as shown in Fig.7 .



Fig. 6

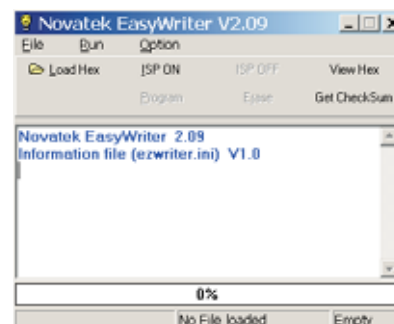


Fig. 7

2. Press the Load hex then select the hex as shown in Fig. 8.

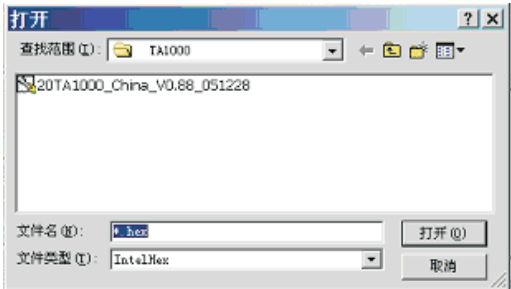


Fig. 8

3 Press the AUTO to running program , the firmware be updated as shown in Fig. 9~10.

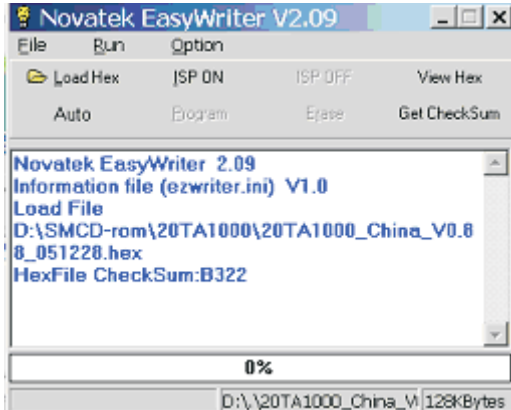


Fig. 9

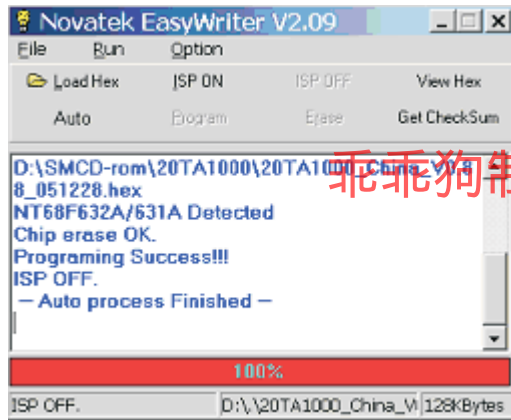


Fig. 10

4 Press the file --> exit to end program , as shown in Fig. 11.

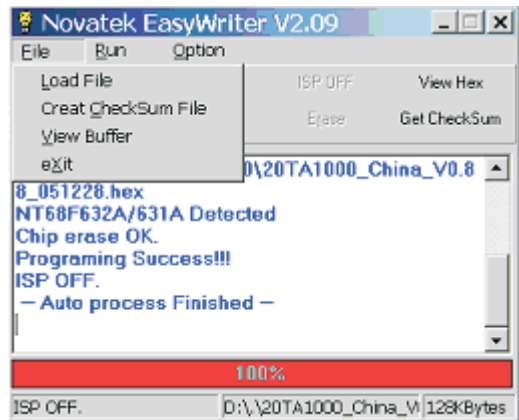


Fig. 11

If there is a warring message coming as shown in Fig 12. , you have to check the AC power, Video cable, or Novatek MCU.

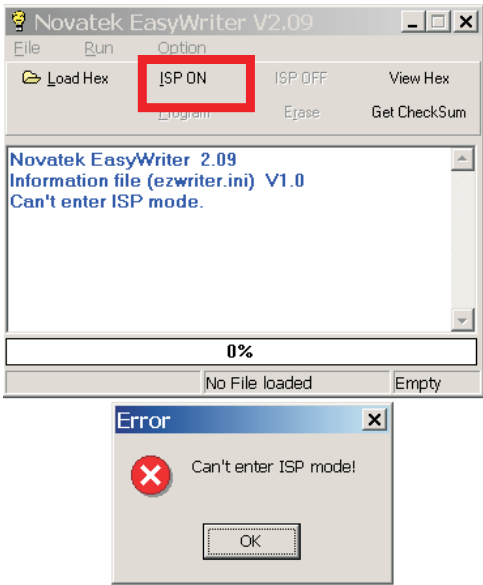


Fig. 12

5 Check the firmware version

- 1). Turn off monitor.
- 2). Press power " " button. Then quickly push " + " and " - " of Volume ,and hold this two buttons , then the screen comes out "Waiting For Automatic Adjustment ",then the screen will be black for one second untill comes out "Windows screen"] => then release this two buttons.
- 3). Press "MENU" button, wait until the OSD menu come on the Screen of the monitor, You will find, after upgrade, the version have already been changed as shown in Fig. 13 and Fig. 14.



Fig. 13

Factory Mode indicator



Fig. 14

Factory Mode indicator

4) Turn off the monitor, exit the factory mode.

8.5 Display adjustment

Access Factory Mode

- 1). Select the source "PC" and turn off monitor.
- 2). Press power "⏻" button. Then quickly push "+" and "-" of Volume, and hold this two buttons, then the screen comes out "Waiting For Automatic Adjustment", then the screen will be black for one second until comes out "Windows screen" => then release this two buttons.
- 3). Press "MENU" button and bring up factory mode indication as shown in Fig.1

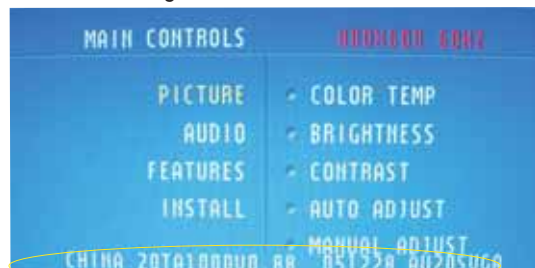


Fig. 1

Use the CHNNEL- and CHNNEL+ to select the "CHINA 20TA1000 V0.88 051228AV20SVGA" and then press the "VOL +" button



Fig.2

PC mode WHITE-D adjustment (B)

1 Apply 800 X600/60Hz mode with 5 block pattern as Fig 3. Set main controls brightness control at 50% and contrast to 50% on User mode. Set color setting at natural color on User mode. Move cursor to "AUTO-color" item on factory mode, press "menu" key to active this function, then scaler will adjust RGB and Color RGB automatically by it self.

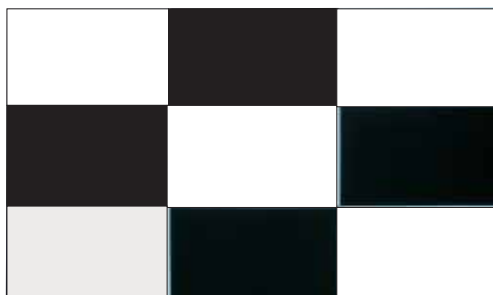


Fig.3

2. Apply a 800*600 / 60Hz signal with full white pattern, set brightness control at 50%, and contrast control at 50%. Adjust the R.G.B gain to reach special color temperature on center of screen.

2.1 Aim the probe CA-A30 at the center of screen as Fig. 4

2.2 Remove the lens protective cover of probe CA-A30.

2.3 Set Measuring/viewing selector to Measuring position for reset analyzer. (Zero calibration) as Fig. 5

2.4 Turn on the colour analyzer (CA-110).

2.5 Press 0-CAL button to start reset analyzer. See Fig. 6



Fig.4

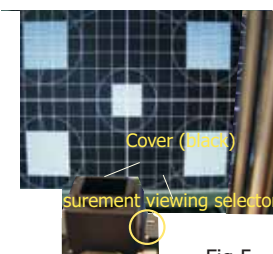


Fig.5

O-CAL

Fig.6



2.6 Switch light probe to Viewing position.

2.7 Move the Lens barrel forward or backward to get clear image as shown in Fig. 7

2.8 Switch light probe to Measuring position. It should be able to indicate colour value on the CA-110.

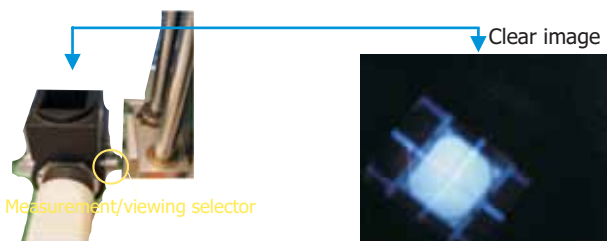


Fig.7

Readings with Minolta CA-110.

2.9 Set Smart picture as WARM, and COOL The SCALER GAIN R G B =

Gains	NORMAL	COOL	WARM
R	127	119	128
G	118	109	111
B	114	112	91

Index of this chapter

- 9.1 Trouble shooting
- 9.2 Circuit Description
- 9.3 IC Data Sheets
- 9.4 Repair Flow Chart

No Power

- . Check the TV power cord. Unplug the TV, wait 10 seconds, then reinsert the plug into the outlet and push the POWER button again.
- . Check that the outlet is not on a wall switch.
- . Be sure the fuse is not blown on the AC power strip, if one is being used.

No Picture

- . Check antenna/cable connections. Are they properly secured to the TV's ANT75Ω plug?
- . Try running the Auto Program feature to find all available channels.
- . Press the AV button on the remote to make sure the correct signal source is selected.
- . If using an accessory device, be sure that it is functioning properly.
- . If in PC Mode, a video signal MUST BE present or the TV will turn off.

No Sound

- . Check the VOLUME buttons.
- . Check the MUTE button on the remote control.
- . If you're attempting to hook up auxiliary equipment, check the audio jack connections.

No AV Signal

- . Check whether AV and S-Video sockets connected simultaneously. If they are, disconnect the S-Video socket. AV signal automatically overrides the S-Video signal if both sockets are connected simultaneously.

S-VHS Color Becomes Faint

- . Unplug socket for S-Video connection. Reconnect the S-Video socket of the TV carefully to the VCR socket.

TV Only Produces MONO Sound

- . If using a cable box with RF only type connections, the signal coming from the cable box will be produced in MONO only.
- . Check Sound control setting. Change setting to Stereo.

Remote Does Not Work

- . Check the batteries. Place lithium cell in the remote. Be sure the (+) and (-) ends of the batteries line up as marked inside the battery compartment.
- . Clean the remote control and the remote control sensor window on the TV.
- . Check the TV power cord. Unplug the TV, wait 10 seconds, then reinsert the plug into the outlet and push the POWER button again.
- . Be sure the fuse is not blown on the AC power strip, if one is being used.
- . Check to be sure the TV outlet is not on a wall switch.
- . Be sure that the remote is in the correct operating mode.
- . Be sure the remote is pointed at the Remote Sensor Window on the TV. See page 2 of the Quick Use Guide for details.

TV Displays Wrong Channel or No Channels Above 13

- . Repeat channel selection.
- . Add the desired channel numbers (using the CHANNEL EDIT control) into the TV's memory.
- . Run the Auto Program feature to find all available channels.

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9.2 Circuit Description

1. General Description

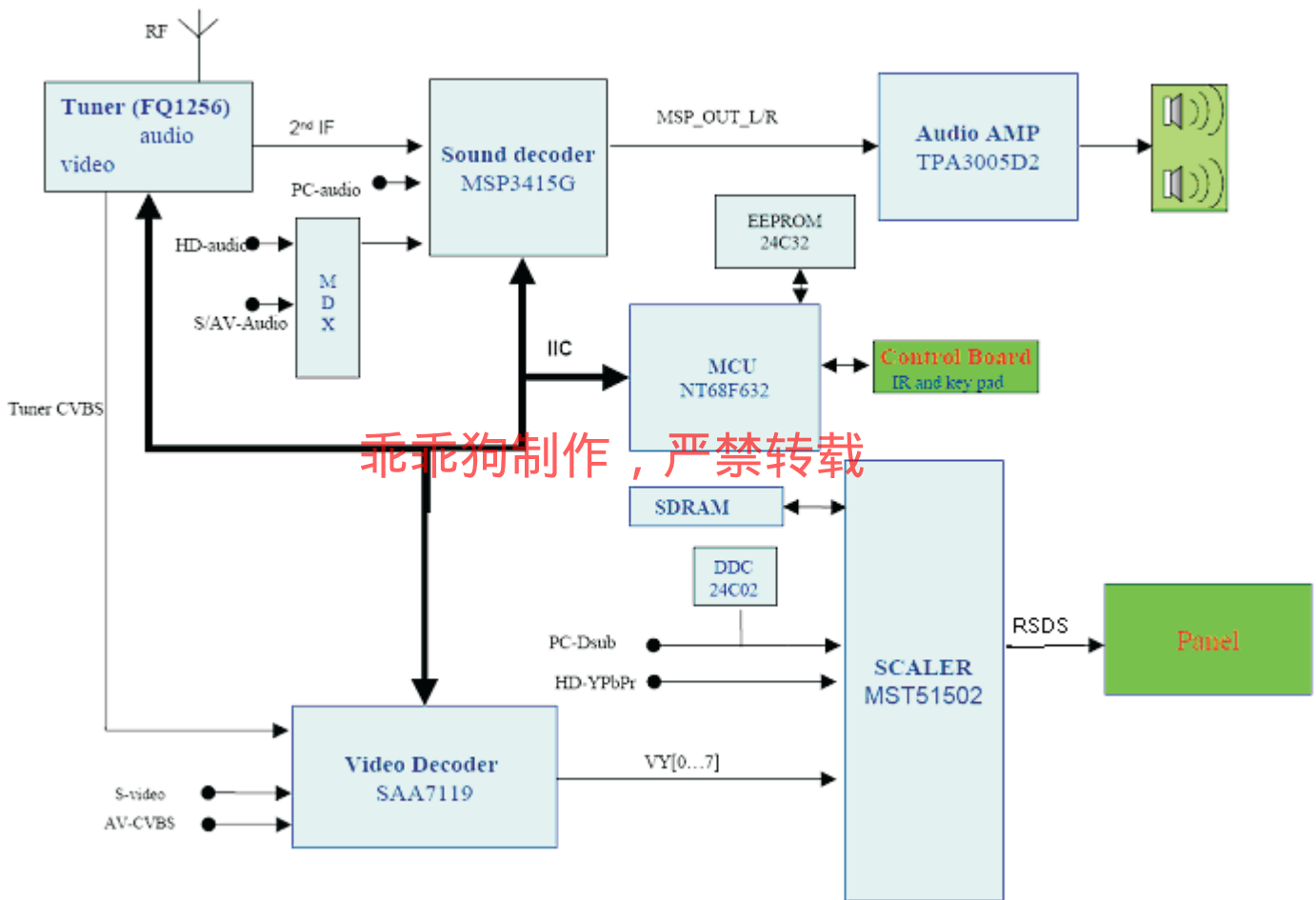
This LCD-TV-F1 support PC analog input up to 800X600 75Hz mode for SVGA panel, and support TV (RF), YC, and CVBS. Also for Y Pb Pr signal input from SDTV to HDTV (480i, 480P, 720P, 1080i 60Hz and 576i, 576P, 720P, 1080i 50Hz).

This LCD - TV use MST51502 as Scaler engine, which has embedded Analog D-sub, digital DVI decoder, scaling input signal to panel OSD mapping and simple 3D de-interlacer. The extra SDRAM is to accomplish video frame rate conversion and PIP function.

The external CPU can be used to back light control, RC, keypad input, IIC I/O communication and. TV tuning control, sound control, and SAA7119A video decoder.

Video decoder SAA7119 is used for TV video processing and convert it with CCIR 601/16bits or 656/8bits digital format and send to Scaler for de-interlace process, and also CC,V-chip data decode.

One audio decoder MSP3415G is used for TV sound processing, and output to post amplifier .



Circuit Description

3. Function description:

MM tuner is used to receive RF wave and output CVBS and 2nd IF signal. CVBS is to video decoder (SAA7119) for color process, 2nd IF is to sound decoder (MSP3415) for audio process. The tuner control is via IIC ex. channel tuning..

Standard TV input (Tuner, S-video, CVBS) is processed by SAA7119, But YPbPr, SDTV and HDTV(480i, 576i, 480p, 576p, 720p, 1080i), is done by scaler MST51502LADC. But the signal is still link to SAA7119 if PIP (video in graph) function is requested. Then all YPbPr signal processed by SAA7119 could be the PIP video source. (* May use down sampling in HD0)

MV protect is decoded by scaler.

Video decoder SAA7119, is in charge of color decoding, could support PAL, NTSC and SECAM world wide system. Compare to SAA7118, SAA7119 improve some picture quality, like V-chip CC I2C read-back, LT1, CT1, skin tone correction(see task A), also the HD0 is supported.

Sound decoder MSP3415 is responsible to sound decode of tuner 2nd IF. It has one 2nd IF, one loudspeaker audio sources input. Due to the input port limitation, a MUX is added for AV source select(PC audio in is sent to msp3415). If the post audio amplifier is gain fixed type then the volume adjust will be on MSP3415.

Scaler MST51502L besides scaling function, PIP, 3D de-interlacer, color enhance are major feature. Even de-interlacer is not so good but for static picture is enough to avoid image sticking.

The scaler structure limitation, the PIP source only from [video port], 8 bits or 16 bits. The sub window /PIP size can enlarge to half screen.

MCU, NT68F632AL, is 128K flash ROM inside. Power control, RC5 I/O, and key function all done by here, more detail function will description in chapter 4.later.

All chip communication is by IIC (SDA/SCL), and ISP is via DDCIIC.

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9.3 IC DATA SHEETS

9.3.1 IC DATA SHEETS - MST51502L (7401)

FEATURES

- Input supports up to UXGA & 1080P
- Panel supports up to SXGA/WXGA
- Integrated two-port triple-ADC/PLL
- Integrated DVI/HDCP compliant receiver
- YUV422 digital video input ports
- Dual high-quality scaling engines
- Built-in 3-D video de-interlacer
- Video-over-graphic PIP
- MStarACE advanced picture/color processing engine
- Embedded On-screen Display Controller (OSD) engine
- 5-Volt tolerant inputs
- Low EMI and power saving features
- Supports PWM & GPO controls
- 256-pin LQFP package
- **Analog RGB/YpPr Input Ports**
 - Dual analog ports support up to 165Mhz
 - Support PC RGB input up to UXGA@60Hz
 - Support HDTV RGB/YpPr/YCbCr up to 1080P
 - On-chip high-performance PLLs
 - Support Composite Sync and SOG (Sync-on-Green) separator
 - Automatic color calibration
- **DVI/HDCP Compliant Input Port**
 - Operates up to 165 MHz (up to UXGA @60Hz)
 - Single link on-chip DVI 1.0 compliant receiver
 - High-bandwidth Digital Content Protection (HDCP) 1.0 compliant receiver
 - Long-cable tolerant robust receiving
- **Video Input Port**
 - Two 4:2:2 BT656 8-bit digital video input ports
 - One 4:2:2 BT601 16-bit digital video input port
 - Support 16-bit YUV 4:2:2 interlaced/progressive video input up to 1080i/720P
- **Auto-Configuration/Auto-Detection**
 - Auto input signal format (SOG, Composite, Separated HSYNC, VSYNC, and DE), and input mode (all PC & TV modes) detection
 - Auto-tuning function including phasing, positioning, offset, gain, and jitter detection
 - Sync Detection for H/V Sync
- **Dual High-Performance Scaling Engines**
 - Fully Programmable shrink/zoom capabilities
 - Nonlinear video scaling supports various modes including Panorama
 - Flexible independent control of sharpness for TV and graphic windows
- **Video Processing & Conversion**
 - 3-D motion adaptive video de-interlacer with edge-oriented adaptive algorithm for smooth low-angle edges
 - Automatic 3:2 pull-down & 2:2 pull-down detection and recovery
 - PIP with programmable size and location, supports multimedia applications
 - Video-over-graphic overlay
 - Frame rate conversion for both main window and sub window
 - MStar Advanced Color Engine (MStarACE) automatic picture enhancement gives:
 - Brilliant and fresh color
 - Intensified contrast and details
 - Vivid skin tone
 - Sharp edge
 - Enhanced depth of field perception
 - Independent picture control for both main window and sub window
 - sRGB compliance allows end-user to experience the same colors as viewed on CRTs and other displays
 - Programmable 10-bit RGB gamma CLUT
- **On-Screen OSD Controller**
 - 16/128 color palette
 - 256/512 1-bit/pixel font
 - 128/256/512 4-bit/pixel font
 - Supports texture function
 - Supports 4K attribute/code
 - Horizontal and vertical stretch of OSD menus
 - Supports button function
 - Pattern generator for production test
 - Supports OSD MUX and alpha blending capability
 - Supports blinking and scrolling for closed caption applications

- External Connection/Component

- Supports 8051 parallel MCU bus
- Supports 4-wire double-data-rate direct MCU bus
- 32-bit data bus for external SDR SDRAM frame buffer
- All system clocks synthesized from a single external clock

clocks synthesized from a single clock

The MST51502 is a high performance and fully integrated graphics processing IC solution for multi-function LCD monitor/TV with resolutions up to SXGA/WXGA. It is configured with an integrated triple-ADC/PLL, an integrated DVI/HDCP receiver, a video de-interlacer, two high quality scaling engines, an on-screen display controller, and a built-in output clock generator. By use of external frame buffer, PIP is provided for multimedia applications. It supports de-interlaced full-screen video, video-on-graphic overlay, frame rate conversion, and aspect ratio conversion for various video sources. To further reduce system costs, the MST51502 also integrates intelligent power management control capability for green-mode requirements and spread-spectrum support for EMI management.

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PIN DESCRIPTION

MCU Interface

Pin Name	Pin Type	Function	Pin
HWRESET	Schmitt Trigger Input w/ 5V-tolerant	Hardware reset. Active high	81
DBUS [7:0]	I/O w/ 5V-tolerant	MCU direct bus (4mA driving strength)	93-86
ALE	I w/ 5V-tolerant	MCU bus ALE. Active high	83
RDZ	I w/ 5V-tolerant	MCU bus RDZ. Active low	84
WDZ	I w/ 5V-tolerant	MCU bus WDZ. Active low	85
INT	Output	MCU bus interrupt (4mA driving strength)	82
BUSTYPE	Input (not 5V-tolerant)	MCU bus type selection <ul style="list-style-type: none"> Low (0V): 4-bit (DBUS[3:0]) DDR Direct Bus High (3.3V): 8-bit (DBUS[7:0]) Direct Bus 	240

Analog Interface

Pin Name	Pin Type	Function	Pin
RMID		Mid-Scale Voltage Bypass	42
REFP		Internal ADC Top De-coupling Pin	43
REFM		Internal ADC Bottom De-coupling Pin	44
REXT	Analog Input	External Resister 390 ohm to AVDD_DVI	15
HSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 0	40
VSNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 0	41
BINOM	Analog Input	Reference Ground for Analog Blue Input from Channel 0	31
BINOP	Analog Input	Analog Blue Input from Channel 0	32
GINOM	Analog Input	Reference Ground for Analog Green Input from Channel 0	33
GINOP	Analog Input	Analog Green Input from Channel 0	34
SOGINO	Analog Input	Sync On Green Input from Channel 0	35
RINOM	Analog Input	Reference Ground for Analog Red Input from Channel 0	36
RINOP	Analog Input	Analog Red Input from Channel 0	37
HSYNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 1	22
VSNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 1	23
BIN1M	Analog Input	Reference Ground for Analog Blue Input from Channel 1	25

Pin Name	Pin Type	Function	Pin
BIN1P	Analog Input	Analog Blue Input from Channel 1	24
GIN1M	Analog Input	Reference Ground for Analog Green Input from Channel 1	28
GIN1P	Analog Input	Analog Green Input from Channel 1	27
SOGIN1	Analog Input	Sync On Green Input from Channel 1	26
RIN1M	Analog Input	Reference Ground for Analog Red Input from Channel 1	30
RIN1P	Analog Input	Analog Red Input from Channel 1	29

DVI Interface

Pin Name	Pin Type	Function	Pin
DVI_R+	Input	DVI Input Channel Red +	3
DVI_R-	Input	DVI Input Channel Red -	4
DVI_G+	Input	DVI Input Channel Green +	6
DVI_G-	Input	DVI Input Channel Green -	7
DVI_B+	Input	DVI Input Channel Blue +	9
DVI_B-	Input	DVI Input Channel Blue -	10
DVI_CK+	Input	DVI Input Clock +	12
DVI_CK-	Input	DVI Input Clock -	13

Video Interface

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Pin Name	Pin Type	Function	Pin
VI_CK	Input w/ 5V-tolerant	Digital Video Input Clock	66
VI_DATA[15:0]	Input w/ 5V-tolerant	Digital Video Input Data[15:0]	61-54, 74-67

LCD Interface

Pin Name	Pin Type	Function	Pin
OCLK	Output w/ Pull-down Resistor	LCD Output Clock; 4~12mA driving strength programmable	210
LDE	Output w/ Pull-down Resistor	LCD Display Enable; 4~12mA driving strength programmable	211
LVSYNC	Output w/ Pull-down Resistor	LCD VSYNC; 4~12mA driving strength programmable	209
LHSYNC	Output w/ Pull-down Resistor	LCD HSYNC; 4~12mA driving strength programmable	208
RA[7:0]	Output w/ Pull-down Resistor	Port A Red Channel Bit[7:0] ; 4~12mA driving strength programmable	187-184, 175-176

IC DATA SHEETS

Pin Name	Pin Type	Function	Pin
GA[7:0]	Output w/ Pull-down Resistor	Port A Green Channel Bit[7:0] ; 4~12mA driving strength programmable	197-194, 191-188
BA[7:0]	Output w/ Pull-down Resistor	Port A Blue Channel Bit[7:0] ; 4~12mA driving strength programmable	207-204, 201-198
RB[7:0]	Output w/ Pull-down Resistor	Port B Red Channel Bit[7:0] ; 4~12mA driving strength programmable	221-214
GB[7:0]	Output w/ Pull-down Resistor	Port B Green Channel Bit[7:0] ; 4~12mA driving strength programmable	233-226
BB[7:0]	Output w/ Pull-down Resistor	Port B Blue Channel Bit[7:0] ; 4~12mA driving strength programmable	244-241, 237-234

GPO Interface

Pin Name	Pin Type	Function	Pin
PWM0	Output	GPO with PWM function (4mA driving strength)	252
PWM1	Output	GPO with PWM function (4mA driving strength)	253
PWM2	Output	GPO with PWM function (4mA driving strength)	98
GPO[0]	Output	GPO (4mA driving strength)	97
GPO[1]	I/O	GPO / FIELD input (4mA driving strength)	96
GPO[2]	I/O	GPO / Digital VSYNC input (4mA driving strength)	95
GPO[3]	I/O	GPO / DE input (4mA driving strength)	94
GPO[4]	I/O	GPO / Secondary video clock input (4mA driving strength)	65
GPO[5]	I/O	GPO / Digital HSYNC input (4mA driving strength)	64
GPO[6]	Output	GPO; 4mA driving strength	251

DRAM Interface

Pin Name	Pin Type	Function	Pin
MCLK	Output	DRAM Memory clock	127
MCLKE	Output	DRAM Memory clock enable	125
RASZ	Output	Row address strobe, active low	132
CASZ	Output	Column address strobe, active low	135
WEZ	Output	Write enable, active low	136
DQM[1:0]	Output	Data mask byte enable	121, 153
BADR[1:0]	Output	Memory bank address	130, 131
MADR[11:0]	Output	Memory address	150-147, 144-137
MDATA[31:0]	I/O	Memory data	102-105, 108-119, 155-158, 161-172

Misc. Interface

Pin Name	Pin Type	Function	Pin
XIN	Crystal Oscillator Input	Xin	255
XOUT	Crystal Oscillator Output	Xout	254
DDCD_CK	Input w/ 5V-Tolerant	HDCP Serial Bus Clock / DDC clock of DVI port	19
DDCD_DA	I/O w/ 5V-tolerant	HDCP Serial Bus Data / DDC data of DVI port (4mA driving strength)	18
BYPASS		For external bypass capacitor	192

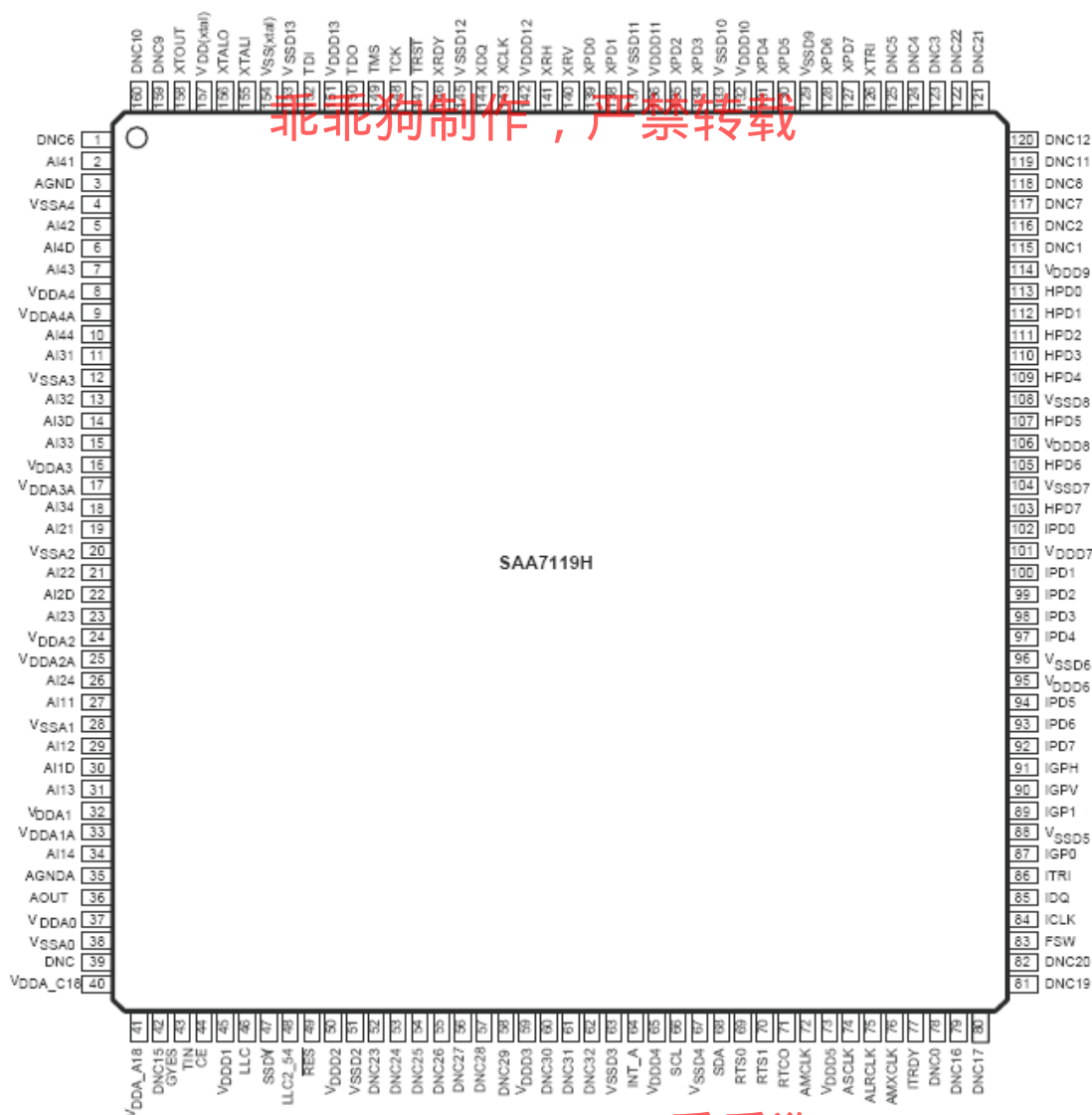
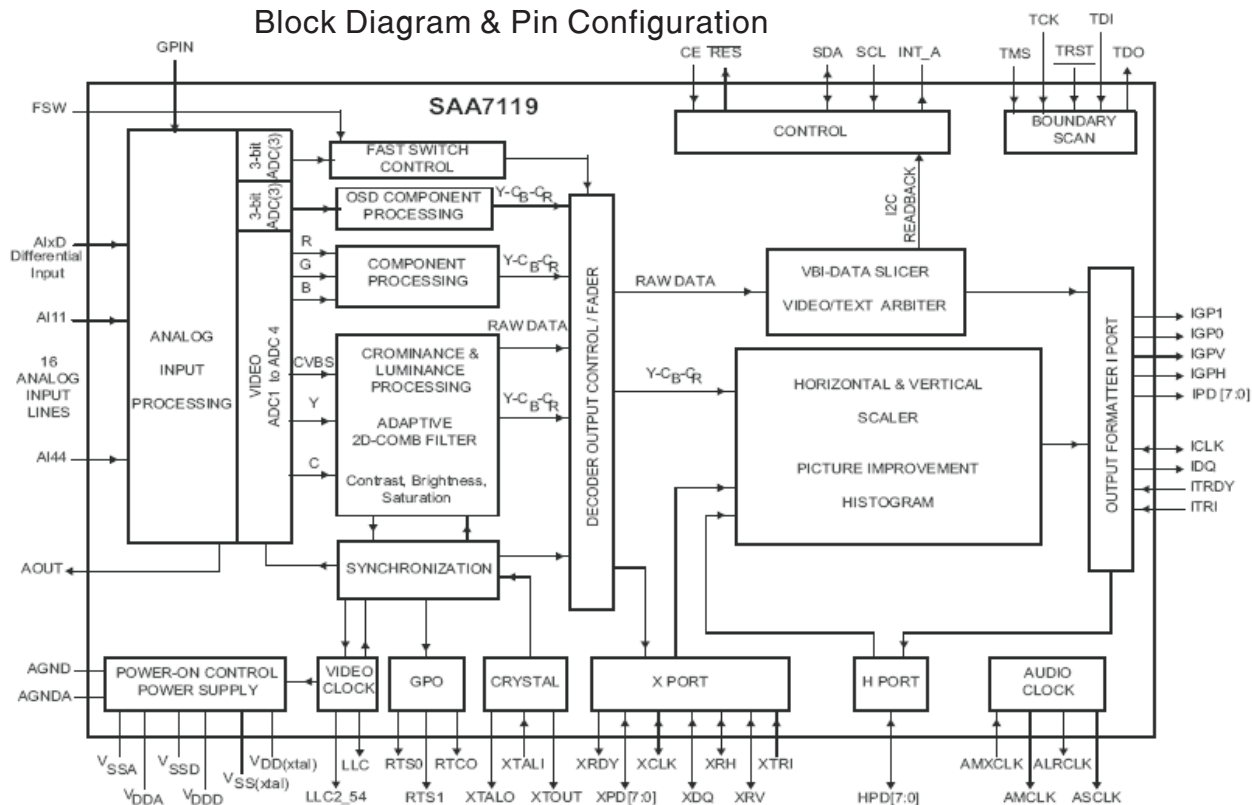
Power Pins

Pin Name	Pin Type	Function	Pin
AVDD_DVI	3.3V Power	DVI Power	8, 14
AVDD_ADC	3.3V Power	ADC Power	21, 38
AVDD_PLL	3.3V Power	PLL Power	16
AVDD_PLL2	3.3V Power	PLL Power	129
AVDD_MPLL	3.3V Power	PLL Power	256
VDDM	3.3V Power	Memory Interface Power	106, 122, 133, 145, 159, 174
VDDP	3.3V Power	Digital Output Power	47, 80, 183, 202, 222, 238
VDDC	2.5V Power	Digital Core Power	62, 77, 99, 151, 180, 213, 225, 246
GND	Ground	Ground	1, 2, 5, 11, 17, 20, 39, 45, 46, 63, 78, 79, 100, 107, 123, 128, 134, 146, 152, 160, 175, 181, 182, 193, 203, 212, 223, 224, 239, 245

No Connects

Pin Name	Pin Type	Function	Pin
NC		No connect. Leave these pins floating.	48-53, 75, 101, 120, 124, 126, 154, 173, 247-250

Block Diagram & Pin Configuration



2. Features

- CMOS technology for low power consumption
- Operating voltage Vcc ranges from 3.0V to 3.6V
- 8031 8-bit CMOS Micro-Processor (uP) core
 - Intel compatible 8031 architecture
 - **256-byte Internal DATA Memory**
 - Two 16-Bit Timer/Counter
 - Fully duplex UART
 - 5-vector interrupt structure with two programmable priority levels
 - High level C-language for the F/W development
- On-Chip Oscillator ➡ 12MHz operating frequency
 - **24/36MHz selectable clock for CPU operating**
 - **Additional 12MHz clock output pin(PE0) for external device operation**
- Reset
 - External Reset Pin
 - Low-Voltage Reset
 - Watch-Dog Timer Reset
 - ISP Reset
- **Power Saving Mode**
 - **Watch-Dog Timer Disable Function**
 - **CPU Idle Mode Support**
- Program memory
 - 128K bytes of on-chip flash memory for program memory
 - **2/4 bank selectable program memory mapping**
 - 2K bytes of Mask ROM for ISP control function
- 1,536 Bytes On-Chip Data Memory
 - Extended 256 Bytes Internal DATA Memory of uP 8031
 - External Data Memory
 - 768 Bytes General Purpose RAM Buffer (\$F400 ~ \$F6FF)
 - 512 Bytes EDID RAM Buffer for Hardware DDC Port (\$F800 ~ \$F9FF)
- A/D Converter
 - 7-Bit resolution
 - 4 selectable Input channels
 - Conversion Range ➡ Absolutely Monotonic linear from GND to VCC
 - Conversion time ➡ 12us
- PWM D/A Converter
 - 8-Bit resolution
 - 10 selectable output channels
 - 6 channels with 3.3V Push-Pull Structure
 - 4 channels with 5V Open-Drain Structure
- 37 Selectable General Purpose I/O Pins with 5V tolerance
- Interrupts ➡ 5-vector interrupt structure with two programmable priority levels for uP F8031
 - TF0: Timer/Counter 0 Overflow Interrupt
 - TF1: Timer/Counter 1 Overflow Interrupt
 - RI+TI: UART Interrupts
 - INT0:
 - Sync Processor Interrupts
 - I²C Bus Port-0 (PB4, PB5) Interrupt

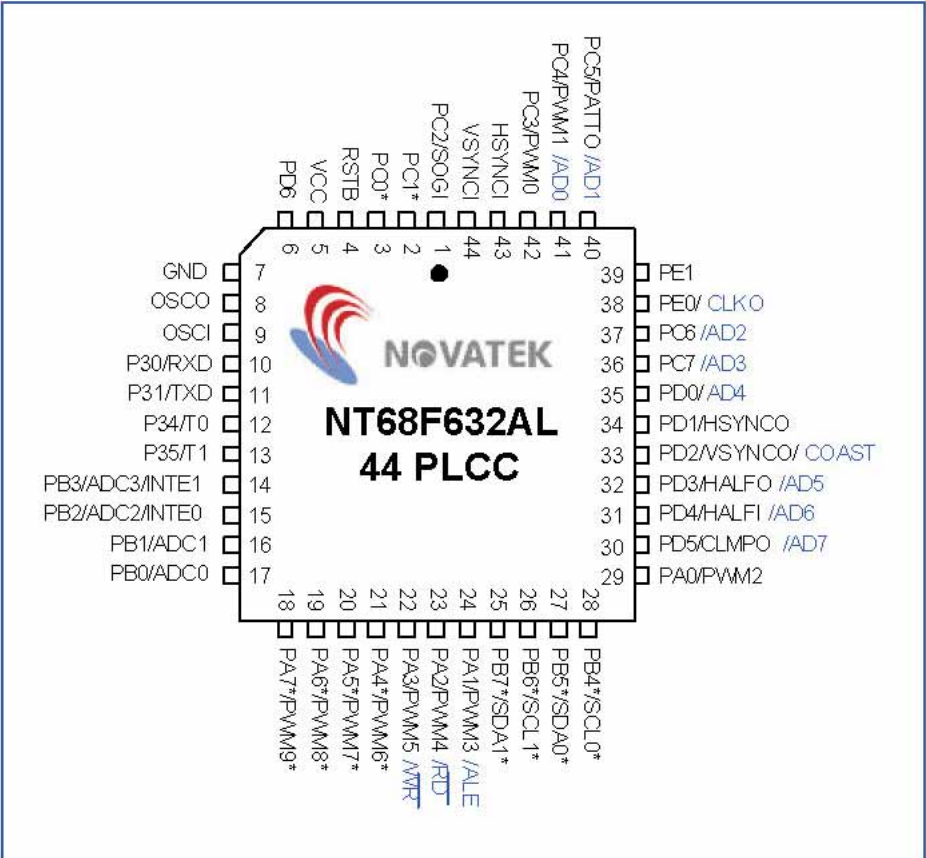
IC DATA sheets

- INT1
 - External Interrupts: INTE0 & INTE1
 - I²C-Bus Port-1 (PB6, PB7) Interrupts
- Sync Processor Unit
 - Input Signal Type ➡ Separate Sync, Composite Sync & Digital-Level Sync-On-Green (SOG)
 - Powerful Polarity detection for HSYNCl and VSYNCl
 - HSYNCO/VSYNCO polarity-controlled outputs
 - **Coast Output for ADC PLL (Composite/SOG input)**
 - Fast Auto-Mute function
 - Half frequency I/O function
 - Timer/Counters with 2-lay content latches for counting sync period/frequency ➡ stable results can be read
 - Clamp pulse output
 - Clamp pulse output at either the leading edge or trailing edge of HSYNCO
 - Selectable Clamp pulse width
 - Selectable pulse output polarity
 - Flexible free-run H/V sync output generator
 - Flexible test pattern generator
- DDC Port
 - Dual independent operation DDC channels
 - Pure hardware solution for VESA DDC1/2B
 - Selectable 128/256 Bytes EDID-Buffer for hardware DDC port
- I²C-bus
 - Two built-in master/slave I²C bus interfaces support VESA 2Bi/2B+
 - SCL clock speed supports up to 400Kbps
- Parallel Bus
 - **8051 compatible, direct 4-bit/8-bit muxed address/data high-speed control interface bus for fast external data memory access (ALE, RD, WR, AD0~7)**
 - **Memory mapping address from \$8000H to \$80FFH**
- Package
 - 44-Pin PLCC

General Description

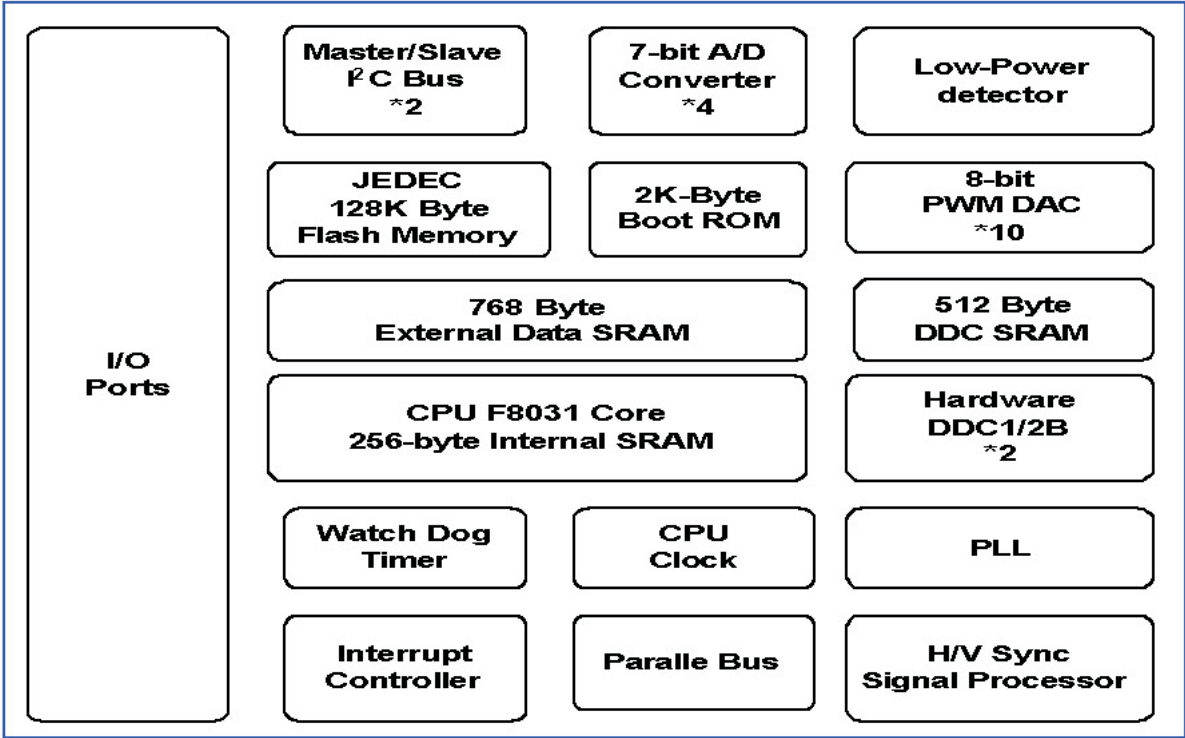
This is an 8031 CPU core embedded micro-controller, which is designed for high-performance low-cost LCD monitor control application. It contains: an embedded 8-bit 8031 micro-controller with 256-byte internal RAM, on-chip 128K bytes flash-type program ROM, 1,280-byte internal data memory, four 7-bit resolution A/D Converter, 10-channel 8-bit resolution PWM DAC, two 16-bit timer/counters, and an UART. In addition to these, it has an internal SYNC processor, two-channel hardware DDC solution, and VESA 2Bi/2B+ master/slave I²C bus interface. In order to accelerate the transmission efficiency, we support fast parallel bus interface to access the external device. Those functions can help the user develop a LCD monitor application as soon as possible.

Pin Configuration



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Block Diagram



Pin and Pad Descriptions

Pin No.	Designation	Function	I/O	Description
1	PC2/SOGI	PC2	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		SOGI	I	Digital-Level Sync-On-Green(SOG) Sync Input; with Schmitt Trigger Input
2	PC1*	PC1*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
3	PC0*	PC0*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
4	RSTB	RSTB	I	Active-Low Reset Input; with Schmitt Trigger Input
5	VCC	VCC	PWR	+3.3V Power Supply Input
6	PD6	PD6	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
7	GND	GND	PWR	Power Ground
8	OSCO	OSCO	O	12MHz External Crystal Output
9	OSCI	OSCI	I	12MHz External Crystal Input
10	P30/RXD	P30	I/O	GPIO Port-30 of Micro-Processor F8031; Bit Operation
		RXD	I	UART RX Data Input of Micro-Processor F8031
11	P31/TXD	P31	I/O	GPIO Port-31 of Micro-Processor F8031; Bit Operation
		TXD	O	UART TX Data Output of Micro-Processor F8031
12	P34/T0	P34	I/O	GPIO Port-34 of Micro-Processor F8031; Bit Operation
		T0	I	Counter/Timer T0 Input of Micro-Processor F8031
13	P35/T1	P35	I/O	GPIO Port-35 of Micro-Processor F8031; Bit Operation
		T1	I	Counter/Timer T1 Input of Micro-Processor F8031
14	PB3/ADC3/INTE1	PB3	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		ADC3	I	A/D Converter Input-3; Hi-Z input
		INTE1	I	External Interrupt input 1; Schmitt Trigger Input
15	PB2/ADC2/INTE0	PB2	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		ADC2	I	A/D Converter Input-2; Hi-Z input
		INTE0	I	External Interrupt input 0, Schmitt Trigger Input
16	PB1/ADC1	PB1	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		ADC1	I	A/D Converter Input-1; Hi-Z input
17	PB0/ADC0	PB0	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		ADC0	I	A/D Converter Input-0; Hi-Z input

Continued

Pin No.	Designation	Function	I/O	Description
18	PA7*/PWM9*	PA7*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
		PWM9*	O	PWM-Type D/A Converter; 5V Open-Drain Structure
19	PA6*/PWM8*	PA6*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
		PWM8*	O	PWM-Type D/A Converter; 5V Open-Drain Structure
20	PA5*/PWM7*	PA5*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
		PWM7*	O	PWM-Type D/A Converter; 5V Open-Drain Structure
21	PA4*/PWM6*	PA4*	I/O	I/O Pin; 5V Open-Drain Structure with Schmitt Trigger Input
		PWM6*	O	PWM-Type D/A Converter; 5V Open-Drain Structure
22	PA3/PWM5/ WR	PA3	I/O	I/O Pin; Schmitt Trigger Input
		PWM5	O	PWM-Type D/A Converter; 3.3V Push-Pull Structure
		WR	O	External Data Memory Write Strobe of Micro-Processor F8031
23	PA2/PWM4/ RD	PA2	I/O	I/O Pin; Schmitt Trigger Input
		PWM4	O	PWM-Type D/A Converter; 3.3V Push-Pull Structure
		RD	O	External Data Memory Read Strobe of Micro-Processor F8031
24	PA1/PWM3/ ALE	PA1	I/O	I/O Pin; Schmitt Trigger Input
		PWM3	O	PWM-Type D/A Converter; 3.3V Push-Pull Structure
		ALE	O	Address Latch Enable to External Data Memory of Micro-Processor F8031
25	PB7*/SDA1*	PB7*	I/O	I/O Pin; Open-Drain with Schmitt Trigger Input
		SDA1*	I/O	5V Open-Drain Serial Data I/O Pin for the DDC Port 1 and the slave/master I ² C-Bus Port 1
26	PB6*/SCL1*	PB6*	I/O	5V I/O Pin; Open-Drain with Schmitt Trigger Input
		SCL1*	I/O	5V Open-Drain Serial Clock I/O Pin for the DDC Port 1 and the slave/master I ² C-Bus Port 1
27	PB5*/SDA0*	PB5*	I/O	5V I/O Pin; Open-Drain with Schmitt Trigger Input
		SDA0*	I/O	5V Open-Drain Serial Data I/O Pin for the DDC Port 0 and the slave/master I ² C-Bus Port 0
28	PB4*/SCL0*	PB4*	I/O	5V I/O Pin; Open-Drain with Schmitt Trigger Input
		SCL0*	I/O	5V Open-Drain Serial Clock I/O Pin for the DDC Port 0 and the slave/master I ² C-Bus Port 0

Continued

Pin No.	Designation	Function	I/O	Description
29	PA0/PWM2	PA0	I/O	I/O Pin; Schmitt Trigger Input
		PWM2	O	PWM-Type D/A Converter; 3.3V Push-Pull Structure
30	PD5/CLMPO/AD7	PD5	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		CLMPO	O	Clamp Pulse Output for DC restoration of the Video Signal; Push-Pull Structure
		AD7	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
31	PD4/HALFI/AD6	PD4	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		HALFI	I	Half Frequency Input; Schmitt Trigger Input
		AD6	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
32	PD3/HALFO/AD5	PD3	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		HALFO	O	Half Frequency Output; Push-Pull Structure
		AD5	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
33	PD2/VSYNCO/COAST	PD2	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		VSYNCO	O	Vertical Sync Output; Push-Pull Structure
		COAST	O	Coast Output for the ADC PLL
34	PD1/HSYNCO	PD1	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		HSYNCO	O	Horizontal Sync Output; Push-Pull Structure
35	PD0/AD4	PD0	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		AD4	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
36	PC7/AD3	PC7	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		AD3	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
37	PC6/AD2	PC6	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		AD2	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031

Continued

Pin No.	Designation	Function	I/O	Description
38	PE0/CLKO	PE0	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		CLKO	O	12MHz clock output; Support to the external device
39	PE1	PE1	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
40	PC5/PATTO/AD1	PC5	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		PATTO	O	Test Pattern Output; Push-Pull Structure
		AD1	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
41	PC4/PWM1/AD0	PC4	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		PWM1	O	PWM-Type D/A Converter; Push-Pull Structure
		AD0	I/O	Multiplexed Address & Data Bus to access external data memory of Micro-Processor F8031
42	PC3/PWM0	PC3	I/O	I/O Pin; Push-Pull Structure with Schmitt Trigger Input
		PWM0	O	PWM-Type D/A Converter; Push-Pull Structure
43	HSYNCI	HSYNCI	I	Horizontal and Composite sync Input; Schmitt Trigger Input
44	VSYNCI	VSYNCI	I	VSYNC/Interrupt Input; Schmitt Trigger Input

Note: The “*” represents the onen-drain structures.

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FEATURES

- 6-W/Ch Into an 8- Ω Load From a 12-V Supply
- Up to 92% Efficient, Class-D Operation Eliminates Need For Heatsinks
- 8.5-V to 18-V Single-Supply Operation
- Four Selectable, Fixed Gain Settings
- Differential Inputs Minimizes Common-Mode Noise
- Space-Saving, Thermally Enhanced PowerPAD™ Packaging
- Thermal Protection and Short Circuit
- Pinout Similar to TPA3002D2, TPA3003D2, and TPA3004D2

APPLICATIONS

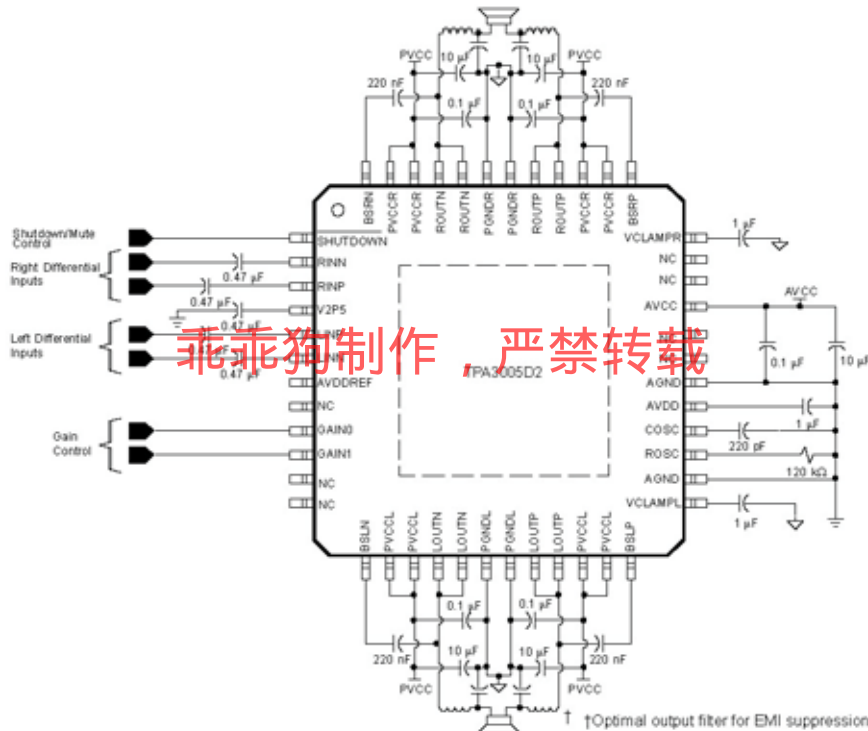
- LCD Monitors and TVs
- All-In-One PCs

DESCRIPTION

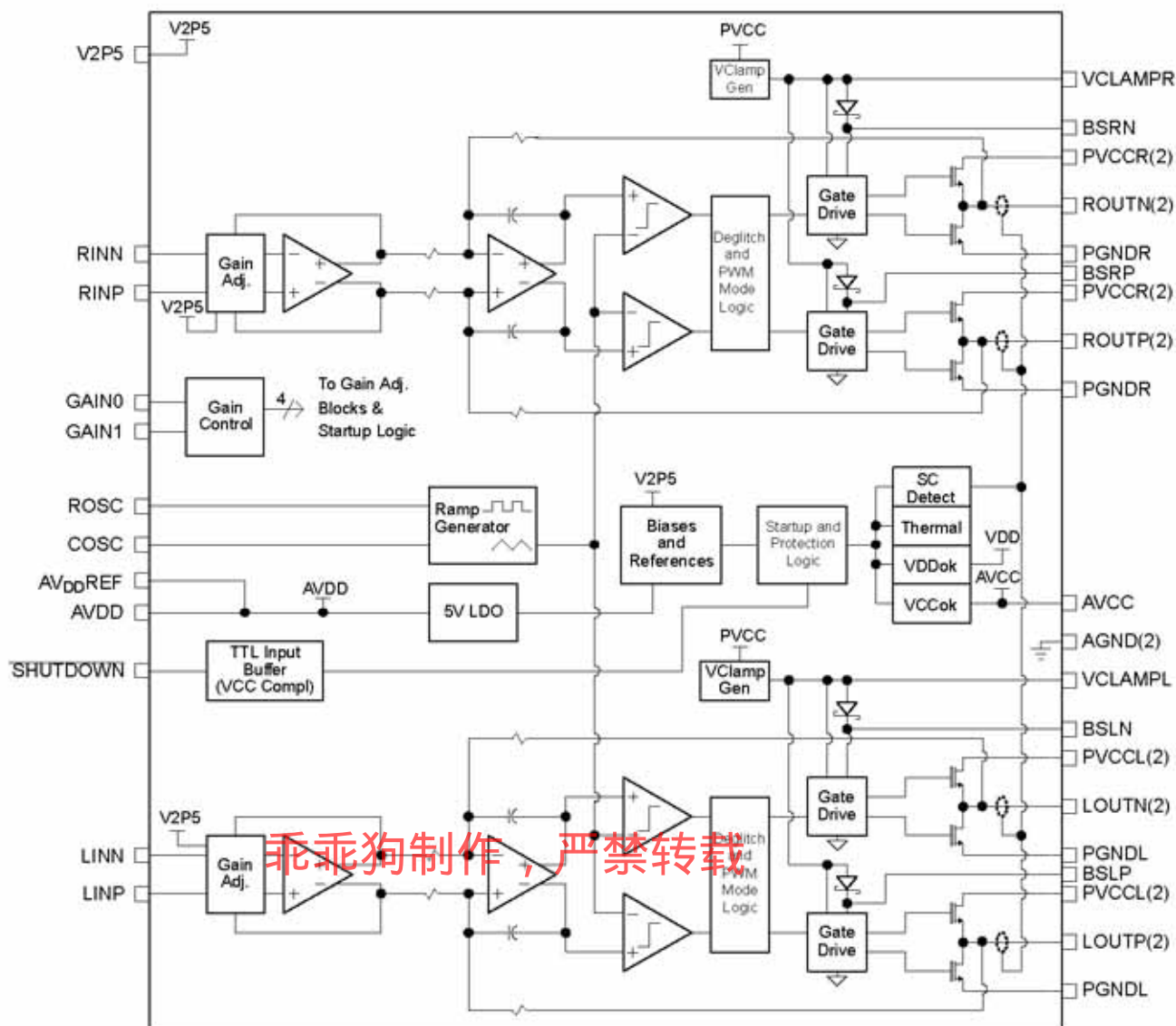
The TPA3005D2 is a 6-W (per channel) efficient, Class-D audio amplifier for driving bridged-tied stereo speakers. The TPA3005D2 can drive stereo speakers as low as 8 Ω . The high efficiency of the TPA3005D2 eliminates the need for external heatsinks when playing music.

The gain of the amplifier is controlled by two gain select pins. The gain selections are 15.3, 21.2, 27.2, and 31.8 dB.

The outputs are fully protected against shorts to GND, VCC, and output-to-output shorts. Thermal protection ensures the maximum junction temperature is not exceeded.



FUNCTIONAL BLOCK DIAGRAM



Multistandard Sound Processor Family

Release Note: Revision bars indicate significant changes to the previous edition. The hardware and software description in this document is valid for the MSP 34x5G version B8 and following versions.

1. Introduction

The MSP 34x5G family of single-chip Multistandard Sound Processors covers the sound processing of all analog TV standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed in a single chip. Figure 1-1 shows a simplified functional block diagram of the MSP 34x5G.

These TV sound processing ICs include versions for processing the multichannel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction, or alternatively, Micronas Noise Reduction (MNR) is performed alignment free.

Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM-Stereo-Radio standard.

Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and

EIA-J. The MSP 34x5G has optimum stereo performance without any adjustments.

All MSP 34xxG versions are pin compatible to the MSP 34xxD. Only minor modifications are necessary to adapt a MSP 34xxD controlling software to the MSP 34xxG. The MSP 34x5G further simplifies controlling software. Standard selection requires a single I²C transmission only.

Note: The MSP 34x5G version has reduced control registers and less functional pins. The remaining registers are software-compatible to the MSP 34x0G. The pinning is compatible to the MSP 34x0G.

The MSP 34x5G has built-in automatic functions: The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I²C interaction is necessary (Automatic Sound Selection).

The MSP 34x5G can handle very high FM deviations even in conjunction with NICAM processing. This is especially important for the introduction of NICAM in China.

The ICs are produced in submicron CMOS technology. The MSP 34x5G is available in the following packages: PSIP54, PSDIP52, PMQFP44, PLQFP64, and PQFP80.

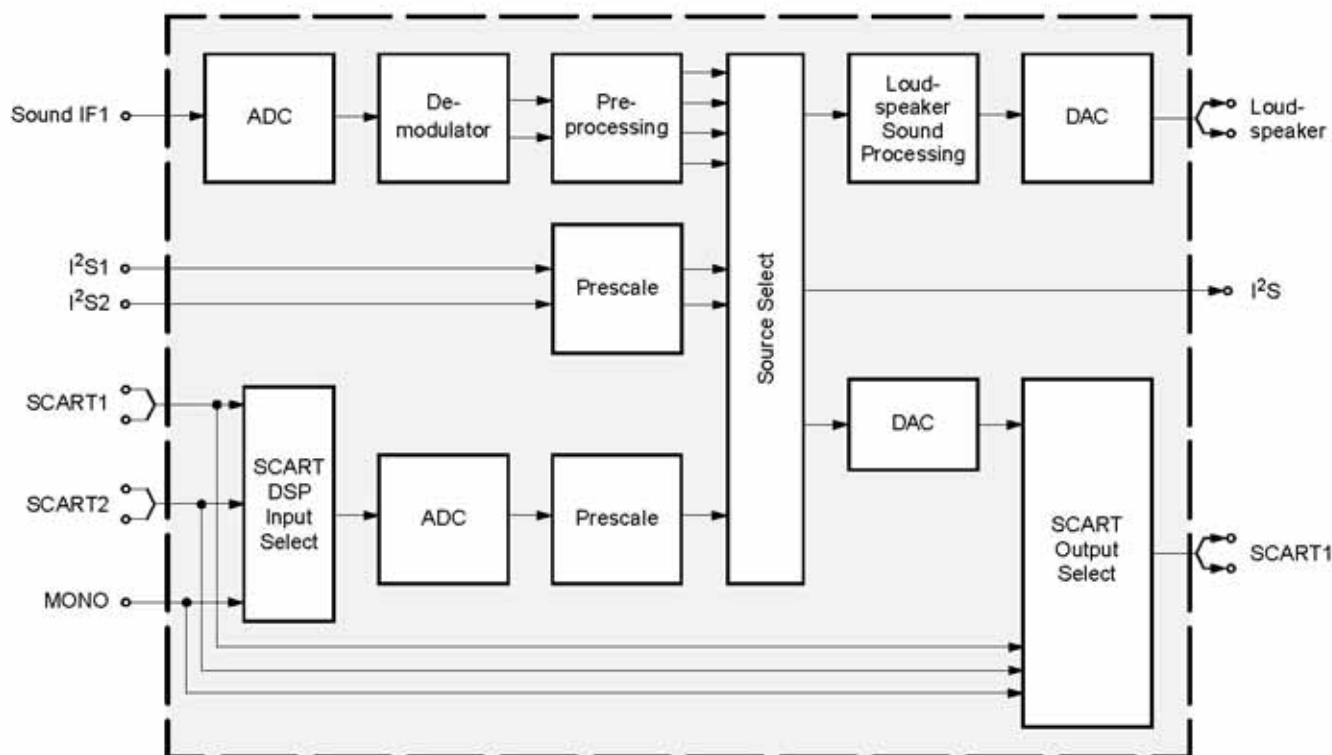
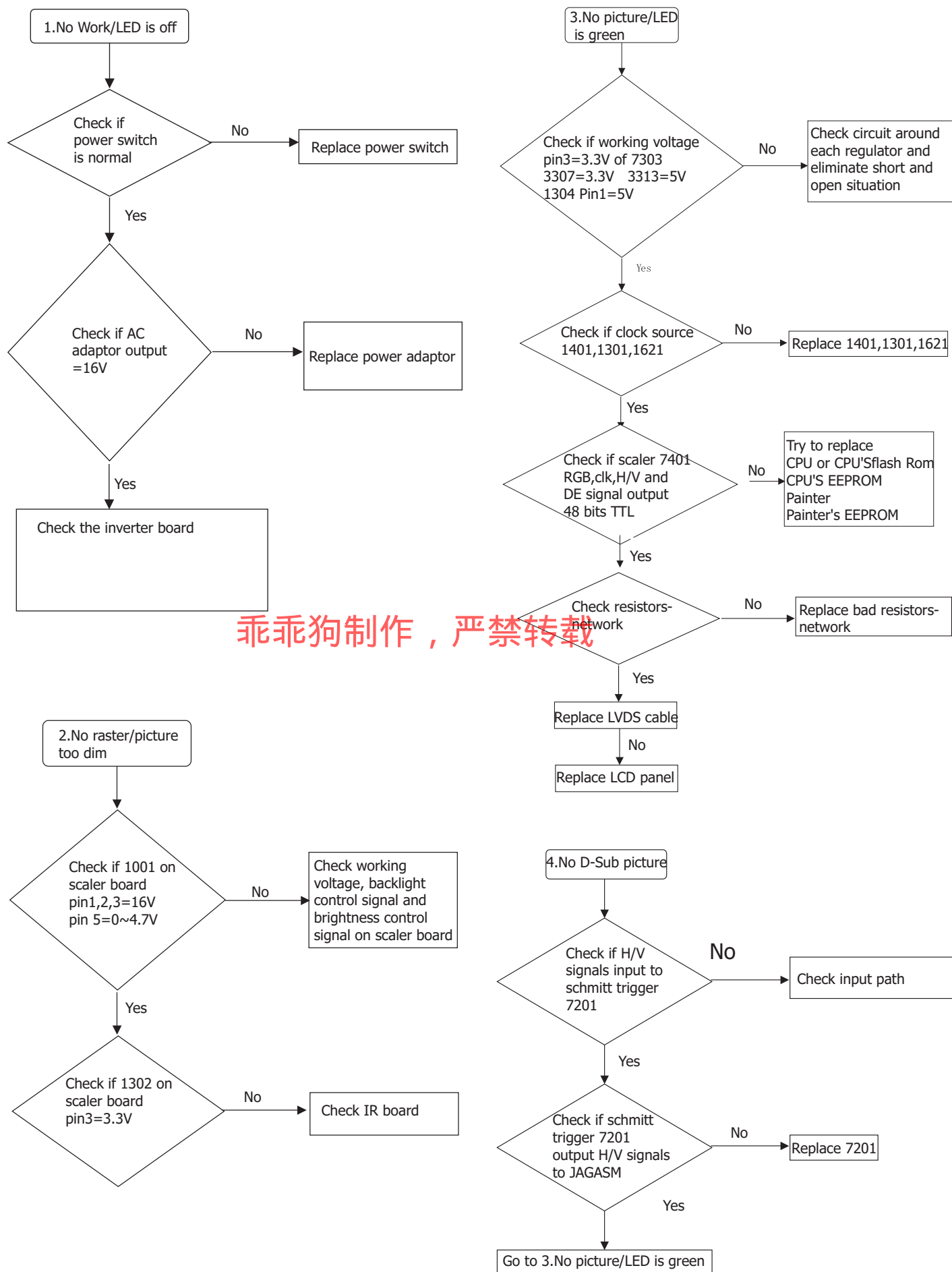
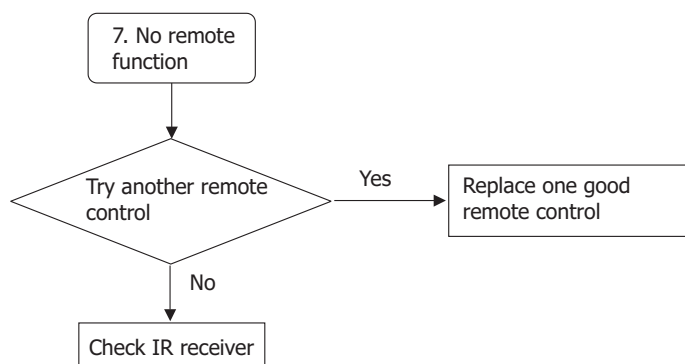
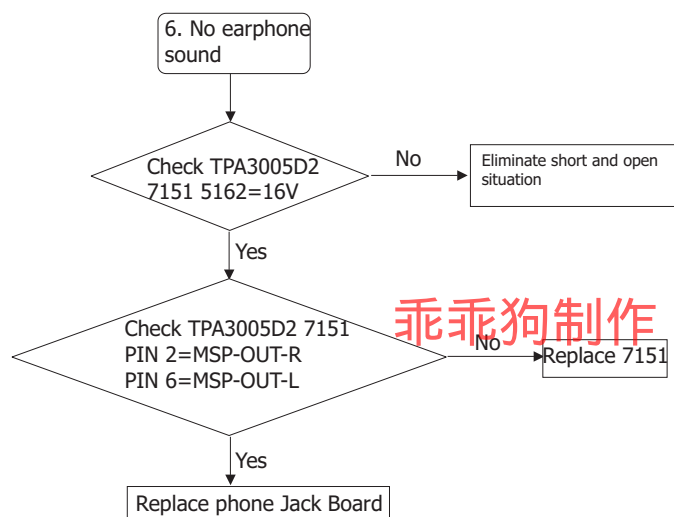
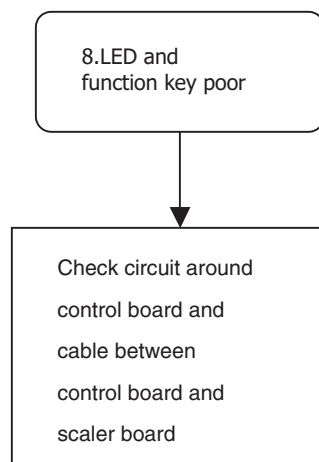
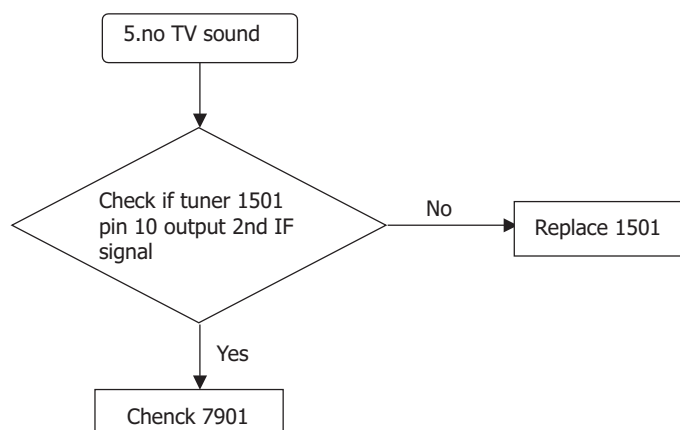


Fig. 1-1: Simplified functional block diagram of MSP 34x5G





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Model type:20TA1000/93(AUO Panel)

Mechanical parts

0007	313815760961	BASE ASSY
0011	313815760891	BEZEL ASSY
0030	313815417671	BEZEL
0031	313815414921	LENS-IR
0032	313815414911	POWER BUTTON
0040	313815414961	BACK COVER
0051	313815136512	MAIN FRAME
0053	313815414981	GASKET(20x20x30L)
0091	313815414931	CONTROL BUTTON
0093	313815136441	SHIELD - SCALER
0109	313815040511	NUT-AUDIO JACK

LCD Panel

1050	93222563682	TFT-LCD A201SN02V4 (AUOP) B
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Packing

0129	313810650281	P.E. BAG (INSTR. BOOK)
0450	313815641771	CARTON
0451	313815641781	CUSHION-L
0452	313815641791	CUSHION-R
0453	313815640141	P.E. FOAM BAG(750 X 800)
0458	313815636362	P.E.BAG 275x320 mm
0506	313815641771	CARTON
0523	313815641771	CARTON

Accessory

0041	313815414971	DOOR-CABLE
0126	313815568821	RATING LABEL
0141	313815524141	QUICK SETUP GUIDE
0143	313912553585	CHINA GUARANTY CARD /93
0145	313815524151	USER'S MANUAL
0176	313810539241	PASS CARD LABEL
0289	313800992061	PROCESS BOX
0291	313815568831	LABEL
0292	313815568831	LABEL

PCB ASSY

1051	313815864011	SCALER ASSY(CHINA 20 AUO)
1052	313815860801	YPbPr-IN PCB ASSY
1053	313815860881	KEY BOARD ASSY
1054	313815860811	IR PCB ASSY

Miscellanea

0615	313811709211	HEX CODE OF F/W(NO MATL REQ)
1001	242202518821	CON V 8P M 2.00 63388 B
1002	242208611053	FUSE SM F 7A 125V UL R
1003	24220605309	SOC SUPP H 1P M DC 2.5MM
4444	313810650010	CD ROM - SERVICE MANUAL
8161	313819874701	CBLE-266 6/360/6-266 AWG28
8174	313819874641	FFC 50/270/50 PITCH 0.5mm
8175	313819874671	CBLE-018 8/180/8-018 AWG28
8176	313819874651	CBLE-012 2/180/2-001 AWG28

PCB ASSY

1051	313815864011	SCALER ASSY(CHINA 20 AUO)
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Various

1101	242254301364	RES XTL SM 18M432 16P SMD-49 R
1151	242202518888	CON H 2P M 2.50 69072 B
1152	313816877251	EARPHONE JACK
1153	242202518894	CON H 2P M 2.00 63362 B
1172	313818871651	MAINSORD CCEE 10A 1M8 DET BK
1176	313923812901	PROD ASSY RC19335016/01B PKD
1177	313818876601	CON ACC ADP V 01P M 0.00/PAL B
1180	313815862162	MAIN FRAME+WIRE ASSY(AUO)
1183	313819876641	PSU OPENFR INVBL6 (DAC-16T003
1184	313819876631	PSU ADAPT 16V 60W (EADP-60FB B
1185	313819875451	LSP BOX 8R 3W - R (P150CR)
1186	313819875441	LSP BOX 8R 3W - R (P150CL)
1201	242202518053	SOC SUBD H 15P F BU 1216 B
1211	243803100429	SOC PHONE H 1P F 3.5 ST B
1251	242202518817	CON V 5P M 2.00 63385 B
1253	242202605451	SOC CINCH H 2P F 1L2 WHRD B
1254	242202605452	SOC CINCH H 3P F 1L3 YEWHRD B
1255	243803100431	SOC MDIN H 4P F 69015 B
1301	242254301501	RES XTL SM 11M059 20P HC49/S R
1302	242202518818	CON V 6P M 2.00 63386 B
1303	242202518894	CON H 2P M 2.00 63362 B
1305	243803100435	SOC IC V 8P F 2.54 DIL L
1401	243854300093	RES XTL SM 14M3181 18P SMD49 R
1501	313815862251	SDRAM ASSY (ISSI)
1553	242202518229	CON H 50P F 0.50 SM FPC 0.3 R

1601	313914723781	FRONTEND FQ1256/I H-5
1621	243854300089	RES XTL SM 24M576 16P HC49/S R

2001	223858619812	CER2 0603 Y5V 50V 100N P8020 R
2002	223858619812	CER2 0603 Y5V 50V 100N P8020 R
2003	202203100173	ELCAP EB 25V S 470U PM20 B
2004	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2005	202203100173	ELCAP EB 25V S 470U PM20 B

2006	223858015641	CER2 0805 X7R 50V 22N PM10 R
2007	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2008	223858015641	CER2 0805 X7R 50V 22N PM10 R
2009	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2011	223858015614	CER2 0805 X7R 50V 220P PM10 R
2012	202203100173	ELCAP EB 25V S 470U PM20 B
2013	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2014	223858015614	CER2 0805 X7R 50V 220P PM10 R
2016	223858619812	CER2 0603 Y5V 50V 100N P8020 R
2019	202203100367	ELCAP SK 16V S 47U PM20 B
2021	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2022	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2023	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2024	202203100367	ELCAP SK 16V S 47U PM20 B
2025	223858619805	CER2 0603 Y5V 50V 10N P8020 R
2026	223878619856	CER2 0603 Y5V 16V 330N P8020 R
2101	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2102	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2103	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2104	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2105	223886715159	CER1 0603 NP0 50V 15P PM5 R
2106	223886715479	CER1 0603 NP0 50V 47P PM5 R
2107	223878615649	CER2 0603 X7R 16V 100N PM10 R
2108	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2109	223824615654	CER2 0603 X7R 10V 220N PM10 R
2111	223878615649	CER2 0603 X7R 16V 100N PM10 R
2112	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2113	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2114	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2115	223858615632	CER2 0603 X7R 50V 4N7 PM10 R
2116	223858615632	CER2 0603 X7R 50V 4N7 PM10 R
2121	223886715159	CER1 0603 NP0 50V 15P PM5 R
2122	223886715159	CER1 0603 NP0 50V 15P PM5 R
2123	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2124	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2131	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2132	223878615649	CER2 0603 X7R 16V 100N PM10 R
2133	223878615649	CER2 0603 X7R 16V 100N PM10 R
2134	223878615649	CER2 0603 X7R 16V 100N PM10 R
2135	223878615649	CER2 0603 X7R 16V 100N PM10 R
2136	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2137	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2138	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2139	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2142	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2143	223891619849	CER2 0805 Y5V 25V 220N P8020 R
2154	223886715101	CER1 0603 NP0 50V 100P PM5 R
2155	223858119716	CER2 1206 Y5V 50V 470N PM20 R
2156	223886715101	CER1 0603 NP0 50V 100P PM5 R
2157	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2158	223891019854	CER2 0805 Y5V 25V 220N P8020 R
2161	223858615623	CER2 0603 X7R 50V 1N PM10 R
2162	223858615623	CER2 0603 X7R 50V 1N PM10 R
2163	223824619858	CER2 0603 Y5V 10V 470N P8020 R
2164	223824619858	CER2 0603 Y5V 10V 470N P8020 R
2165	223824619858	CER2 0603 Y5V 10V 470N P8020 R
2166	223824619858	CER2 0603 Y5V 10V 470N P8020 R
2167	223824619858	CER2 0603 Y5V 10V 470N P8020 R
2168	223891019854	CER2 0805 Y5V 25V 220N P8020 R
2169	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2172	223886715101	CER1 0603 NP0 50V 100P PM5 R
2173	223858119716	CER2 1206 Y5V 50V 470N PM20 R
2174	223886715101	CER1 0603 NP0 50V 100P PM5 R
2175	223891019854	CER2 0805 Y5V 25V 220N P8020 R
2176	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2177	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2178	202203100366	ELCAP SK 50V S 10U PM20 B
2179	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2181	223886115221	CER1 0805 NP0 50V 220P PM5 R
2182	223878615649	CER2 0603 X7R 16V 100N PM10 R
2183	202203100366	ELCAP SK 50V S 10U PM20 B
2184	202203100366	ELCAP SK 50V S 10U PM20 B
2185	202203100366	ELCAP SK 50V S 10U PM20 B
2186	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2187	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2191	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2192	202203100173	ELCAP EB 25V S 470U PM20 B
2193	202203100173	ELCAP EB 25V S 470U PM20 B
2194	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2195	223891619849	CER2 0603 Y5V 25V 100N P8020 R
2201	223878615649	CER2 0603 X7R 16V 100N PM10 R
2202	223886715109	CER1 0603 NP0 50V 10P PM5 R
2203	223886715339	CER1 0603 NP0 50V 33P PM5 R
2204	223886715101	CER1 0603 NP0 50V 100P PM5 R
2205	223886715568	CER1 0603 NP0 50V 5P6 PM0P5 R
2206	223886715568	CER1 0603 NP0 50V 5P6 PM0P5 R
2207	223886715568	CER1 0603 NP0 50V 5P6 PM0P5 R
2209	223878615649	CER2 0603 X7R 16V 100N PM10 R

2211	223886715331	CER1 0603 NP0 50V 330P PM5 R
2212	223886715331	CER1 0603 NP0 50V 330P PM5 R
2213	223886715331	CER1 0603 NP0 50V 330P PM5 R
2214	223886715331	CER1 0603 NP0 50V 330P PM5 R
2215	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2251	223886715331	CER1 0603 NP0 50V 330P PM5 R
2252	223886715331	CER1 0603 NP0 50V 330P PM5 R
2253	223886715101	CER1 0603 NP0 50V 100P PM5 R
2254	223886715331	CER1 0603 NP0 50V 330P PM5 R
2255	223886715331	CER1 0603 NP0 50V 330P PM5 R
2256	223886715331	CER1 0603 NP0 50V 330P PM5 R
2257	223886715331	CER1 0603 NP0 50V 330P PM5 R
2258	223886715101	CER1 0603 NP0 50V 100P PM5 R
2259	223886715229	CER1 0603 NP0 50V 22P PM5 R
2261	223886715101	CER1 0603 NP0 50V 100P PM5 R
2262	223886715229	CER1 0603 NP0 50V 22P PM5 R
2269	223886715331	CER1 0603 NP0 50V 330P PM5 R
2272	223886715331	CER1 0603 NP0 50V 330P PM5 R
2301	202203100367	ELCAP SK 16V S 47U PM20 B
2302	223878615649	CER2 0603 X7R 16V 100N PM10 R
2303	223886715229	CER1 0603 NP0 50V 22P PM5 R
2304	223886715229	CER1 0603 NP0 50V 22P PM5 R
2305	223858615623	CER2 0603 X7R 50V 1N PM10 R
2306	223886715109	CER1 0603 NP0 50V 10P PM5 R
2307	222224119876	CER2 1206 Y5V 10V 10U P8020 R
2308	223824619863	CER2 0603 Y5V 10V 1U P8020 R
2312	223858615636	CER2 0603 X7R 50V 10N PM10 R
2313	223858615636	CER2 0603 X7R 50V 10N PM10 R
2314	223858615636	CER2 0603 X7R 50V 10N PM10 R
2315	223858615636	CER2 0603 X7R 50V 10N PM10 R
2317	223878615649	CER2 0603 X7R 16V 100N PM10 R
2318	223878615649	CER2 0603 X7R 16V 100N PM10 R
2321	223886715229	CER1 0603 NP0 50V 22P PM5 R
2322	223886715229	CER1 0603 NP0 50V 22P PM5 R
2401	223878615649	CER2 0603 X7R 16V 100N PM10 R
2402	223878615649	CER2 0603 X7R 16V 100N PM10 R
2403	223878615645	CER2 0603 X7R 16V 47N PM10 R
2404	223878615645	CER2 0603 X7R 16V 47N PM10 R
2405	223858615623	CER2 0603 X7R 50V 1N PM10 R
2406	223878615645	CER2 0603 X7R 16V 47N PM10 R
2407	223878615645	CER2 0603 X7R 16V 47N PM10 R
2408	223878615645	CER2 0603 X7R 16V 47N PM10 R
2409	223878615645	CER2 0603 X7R 16V 47N PM10 R
2411	223878615645	CER2 0603 X7R 16V 47N PM10 R
2412	223858615623	CER2 0603 X7R 50V 1N PM10 R
2413	223878615645	CER2 0603 X7R 16V 47N PM10 R
2414	223878615645	CER2 0603 X7R 16V 47N PM10 R
2415	223858615636	CER2 0603 X7R 50V 10N PM10 R
2416	223878615649	CER2 0603 X7R 16V 100N PM10 R
2417	223886715229	CER1 0603 NP0 50V 22P PM5 R
2418	223886715229	CER1 0603 NP0 50V 22P PM5 R
2419	223886715568	CER1 0603 NP0 50V

2466	223878619854	CER2 0603 Y5V 16V 220N P8020 R	3201	232270260101	RST SM 0603 RC21 100R PM5 R	3551	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2501	223878615649	CER2 0603 X7R 16V 100N PM10 R	3202	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3552	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2502	223878615649	CER2 0603 X7R 16V 100N PM10 R	3203	232270260101	RST SM 0603 RC21 100R PM5 R	3553	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2503	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3204	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3554	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2504	223878615649	CER2 0603 X7R 16V 100N PM10 R	3205	232270260101	RST SM 0603 RC21 100R PM5 R	3555	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2505	223878615649	CER2 0603 X7R 16V 100N PM10 R	3206	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3556	235003510479	RST NETW SM ARV24 4X 47R PM5 R
2506	223878615649	CER2 0603 X7R 16V 100N PM10 R	3207	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3557	232270260479	RST SM 0603 RC21 47R PM5 R
2507	223878615649	CER2 0603 X7R 16V 100N PM10 R	3208	232270260101	RST SM 0603 RC21 100R PM5 R	3558	212211805635	RST SM 0603 RC0603 10R PM5 R
2552	223886715108	CER1 0603 NP0 50V 1P PM0P25 R	3211	212211805641	RST SM 0603 RC0603 68R PM5 R	3561	232270260479	RST SM 0603 RC21 47R PM5 R
2553	223886715109	CER1 0603 NP0 50V 1P PM5 R	3213	232270260759	RST SM 0603 RC21 75R PM5 R	3562	232270260479	RST SM 0603 RC21 47R PM5 R
2554	223858615623	CER2 0603 X7R 50V 1N PM10 R	3214	212211805641	RST SM 0603 RC0603 68R PM5 R	3609	232270260479	RST SM 0603 RC21 47R PM5 R
2556	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3215	212211805641	RST SM 0603 RC0603 68R PM5 R	3611	232270260279	RST SM 0603 RC21 27R PM5 R
2601	223886715229	CER1 0603 NP0 50V 22P PM5 R	3217	232270260759	RST SM 0603 RC21 75R PM5 R	3624	212211805665	RST SM 0603 RC0603 4K7 PM5 R
2603	223886715101	CER1 0603 NP0 50V 100P PM5 R	3218	212211805641	RST SM 0603 RC0603 68R PM5 R	3625	232270260101	RST SM 0603 RC21 100R PM5 R
2604	223886715479	CER1 0603 NP0 50V 47P PM5 R	3221	212211805641	RST SM 0603 RC0603 68R PM5 R	3627	235003510101	RST NETW SM ARV24 4X100R PM5 R
2605	202203100074	ELCAP KM 16V S 1000U PM20 B	3223	232270260759	RST SM 0603 RC21 75R PM5 R	3628	235003510101	RST NETW SM ARV24 4X100R PM5 R
2606	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3224	212211805641	RST SM 0603 RC0603 68R PM5 R	3632	232270260479	RST SM 0603 RC21 47R PM5 R
2607	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3225	232270260101	RST SM 0603 RC21 100R PM5 R	3633	232270260479	RST SM 0603 RC21 47R PM5 R
2621	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3231	212211805656	RST SM 0603 RC0603 1K PM5 R	3634	232270260479	RST SM 0603 RC21 47R PM5 R
2622	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3232	212211805675	RST SM 0603 RC0603 27K PM5 R	3635	232270260479	RST SM 0603 RC21 47R PM5 R
2623	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3233	212211805656	RST SM 0603 RC0603 1K PM5 R	4602	232270296001	RST SM 0603 JUMP. MAX 0R05 R
2624	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3234	212211805675	RST SM 0603 RC0603 27K PM5 R	4623	232270296001	RST SM 0603 JUMP. MAX 0R05 R
2625	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3235	212211805665	RST SM 0603 RC0603 4K7 PM5 R			
2626	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3251	232270260279	RST SM 0603 RC21 27R PM5 R	5001	313818875691	COI CHOKE 35UH 82M OHM DR10X8
2627	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3252	232270260479	RST SM 0603 RC21 47R PM5 R	5002	313818875691	COI CHOKE 35UH 82M OHM DR10X8
2628	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3253	232270461002	RST SM 0603 RC22H 1K PM1 R	5003	243853598058	IND FXD BEAD EMI 100MHZ 80R A
2631	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3254	212211805675	RST SM 0603 RC0603 27K PM5 R	5004	242254900211	IND FXD 0805 EMI 100MHZ 220R R
2632	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3255	232270461002	RST SM 0603 RC22H 1K PM1 R	5005	242254900211	IND FXD 0805 EMI 100MHZ 220R R
2633	223891619849	CER2 0603 Y5V 25V 100N P8020 R	3256	212211805675	RST SM 0603 RC0603 27K PM5 R	5101	242253595853	IND FXD SM 0603 0U10 PM10 R
2634	223886715279	CER1 0603 NP0 50V 27P PM5 R	3257	232270260279	RST SM 0603 RC21 27R PM5 R	5102	242253595853	IND FXD SM 0603 0U10 PM10 R
2635	223886715279	CER1 0603 NP0 50V 27P PM5 R	3258	232270260479	RST SM 0603 RC21 47R PM5 R	5151	242253600782	IND FXD TSL0808 S 33U PM10 B
2636	223878615649	CER2 0603 X7R 16V 100N PM10 R	3261	232270260279	RST SM 0603 RC21 27R PM5 R	5152	242254900126	IND FXD 0805 EMI 100MHZ 120R R
2637	223878616641	CER2 0603 X7R 16V 22N PM10 R	3262	232270260479	RST SM 0603 RC21 47R PM5 R	5153	242254900126	IND FXD 0805 EMI 100MHZ 120R R
2638	223878616641	CER2 0603 X7R 16V 22N PM10 R	3264	212211805635	RST SM 0603 RC0603 10R PM5 R	5154	242253600782	IND FXD TSL0808 S 33U PM10 B
2639	223878616641	CER2 0603 X7R 16V 22N PM10 R	3265	212211805635	RST SM 0603 RC0603 10R PM5 R	5155	242253600782	IND FXD TSL0808 S 33U PM10 B
2641	223878616641	CER2 0603 X7R 16V 22N PM10 R	3266	212211805635	RST SM 0603 RC0603 10R PM5 R	5156	242253600782	IND FXD TSL0808 S 33U PM10 B
2642	223878616641	CER2 0603 X7R 16V 22N PM10 R	3281	212211805656	RST SM 0603 RC0603 1K PM5 R	5157	242254900126	IND FXD 0805 EMI 100MHZ 120R R
2644	223878616641	CER2 0603 X7R 16V 22N PM10 R	3282	212211805675	RST SM 0603 RC0603 27K PM5 R	5158	242254900126	IND FXD 0805 EMI 100MHZ 120R R
2646	223878616641	CER2 0603 X7R 16V 22N PM10 R	3283	212211805656	RST SM 0603 RC0603 1K PM5 R	5161	242254900449	IND FXD 0805 EMI 100MHZ 200R R
2647	223878616641	CER2 0603 X7R 16V 22N PM10 R	3289	212211805675	RST SM 0603 RC0603 27K PM5 R	5162	242253600428	IND FXD TSL0808 S 10U PM10 B
2649	223878616641	CER2 0603 X7R 16V 22N PM10 R	3301	232270461005	RST SM 0603 RC22H 1M PM1 R	5201	823827736006	IND FXD 0603 EMI 100MHZ 120R R
2651	223878616641	CER2 0603 X7R 16V 22N PM10 R	3302	232270260332	RST SM 0603 RC21 3K3 PM5 R	5202	823827736006	IND FXD 0603 EMI 100MHZ 120R R
2652	223878616641	CER2 0603 X7R 16V 22N PM10 R	3303	232270260332	RST SM 0603 RC21 3K3 PM5 R	5203	823827736006	IND FXD 0603 EMI 100MHZ 120R R
2653	223878616641	CER2 0603 X7R 16V 22N PM10 R	3304	232270260332	RST SM 0603 RC21 3K3 PM5 R	5204	242254900211	IND FXD 0805 EMI 100MHZ 220R R
2654	223878616641	CER2 0603 X7R 16V 22N PM10 R	3305	232270260332	RST SM 0603 RC21 3K3 PM5 R	5253	242253595853	IND FXD SM 0603 0U10 PM10 R
2655	223878615649	CER2 0603 X7R 16V 100N PM10 R	3306	232270260332	RST SM 0603 RC21 3K3 PM5 R	5254	242253595853	IND FXD SM 0603 0U10 PM10 R
2656	222224119876	CER2 1206 Y5V 10V 10U P8020 R	3307	232270260332	RST SM 0603 RC21 3K3 PM5 R	5301	242254900211	IND FXD 0805 EMI 100MHZ 220R R
2657	202203100367	ELCAP SK 16V S 47U PM20 B	3308	232270260332	RST SM 0603 RC21 3K3 PM5 R	5302	242254944527	IND FXD 0603 EMI 100MHZ 600R R
2658	223878616641	CER2 0603 X7R 16V 22N PM10 R	3309	232270260332	RST SM 0603 RC21 3K3 PM5 R	5303	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3001	212211805666	RST SM 0603 RC0603 5K6 PM5 R	3311	212211805661	RST SM 0603 RC0603 2K2 PM5 R	5401	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3002	232270260101	RST SM 0603 RC21 100R PM5 R	3312	212211805665	RST SM 0603 RC0603 4K7 PM5 R	5402	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3003	232270260103	RST SM 0603 RC21 10K PM5 R	3313	212211805665	RST SM 0603 RC0603 4K7 PM5 R	5403	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3004	232270260223	RST SM 0603 RC21 22K PM5 R	3314	232270260223	RST SM 0603 RC21 22K PM5 R	5404	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3005	212211805666	RST SM 0603 RC0603 5K6 PM5 R	3315	232270260332	RST SM 0603 RC21 3K3 PM5 R	5405	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3006	232270260101	RST SM 0603 RC21 100R PM5 R	3316	232270260332	RST SM 0603 RC21 3K3 PM5 R	5406	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3007	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3317	232270260332	RST SM 0603 RC21 3K3 PM5 R	5407	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3008	232270260103	RST SM 0603 RC21 10K PM5 R	3327	232270461002	RST SM 0603 RC22H 1K PM1 R	5408	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3009	232270260362	RST SM 0603 RC21 3K6 PM5 R	3329	232270260101	RST SM 0603 RC21 100R PM5 R	5551	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3011	212211805656	RST SM 0603 RC0603 1K PM5 R	3331	232270260101	RST SM 0603 RC21 100R PM5 R	5601	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3013	232270260101	RST SM 0603 RC21 100R PM5 R	3402	232270463901	RST SM 0603 RC22H 390R PM1 R	5621	242254900211	IND FXD 0805 EMI 100MHZ 220R R
3014	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3403	232270260471	RST SM 0603 RC21 470R PM5 R	5622	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3015	232270260103	RST SM 0603 RC21 10K PM5 R	3404	232270260471	RST SM 0603 RC21 470R PM5 R	5623	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3016	232270260332	RST SM 0603 RC21 3K3 PM5 R	3405	232270260101	RST SM 0603 RC21 100R PM5 R	5624	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3017	232270260223	RST SM 0603 RC21 22K PM5 R	3406	235003510101	RST NETW SM ARV24 4X100R PM5 R	5625	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3018	212211805666	RST SM 0603 RC0603 5K6 PM5 R	3407	235003510101	RST NETW SM ARV24 4X100R PM5 R	5626	242254944527	IND FXD 0603 EMI 100MHZ 600R R
3019	232270260473	RST SM 0603 RC21 47K PM5 R	3409	232270461002	RST SM 0603 RC22H 1K PM1 R			
3021	232270260223	RST SM 0603 RC21 22K PM5 R	3411	232270260101	RST SM 0603 RC21 100R PM5 R	6001	932221745685	DIO REC SM SSA34-E3 (VISH) R
3022	232270260103	RST SM 0603 RC21 10K PM5 R	3412	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6002	932220347685	DIO REG SM BZX84-B16-V (VISH)R
3023	212211805665	RST SM 0603 RC0603 4K7 PM5 R	3413	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6003	932221745685	DIO REC SM SSA34-E3 (VISH) R
3024	232270260223	RST SM 0603 RC21 22K PM5 R	3414	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6006	933913910115	DIO SIG SM BAS32L (PHSE) R
3031	232270260223	RST SM 0603 RC21 22K PM5 R	3415	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6101	933913910115	DIO SIG SM BAS32L (PHSE) R
3032	232270260103	RST SM 0603 RC21 10K PM5 R	3416	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6201	933913910115	DIO SIG SM BAS32L (PHSE) R
3034	232270260223	RST SM 0603 RC21 22K PM5 R	3417	235003510229	RST NETW SM ARV24 4X 22R PM5 R	6202	933913910115	DIO SIG SM BAS32L (PHSE) R
3101	232270260101	RST SM 0603 RC21 100R PM5 R	3418	235003510229	RST NETW SM ARV24 4X 22R PM5 R			
3104	212211805675	RST SM 0603 RC0603 27R PM5 R	3419	232270461005	RST SM 0603 RC22H 1M PM1 R	7001	932219076668	IC SM L5972D (ST00) R
3105	232270260101	RST SM 0603 RC21 100R PM5 R	3421	232270260479	RST SM 0603 RC21 47R PM5 R	7002	933589600215	TRA SIG SM BC847C (PHSE) R
3151	212211805683	RST SM 0603 RC0603 100K PM5 R	3422	212211805635	RST SM 0603 RC0603 10R PM5 R	7003	933589600215	TRA SIG SM BC847C (PHSE) R
3152	212211805672	RST SM 0603 RC0603 15K PM5 R	3424	212211805641	RST SM 0603 RC0603 68R PM5 R	7004	932219076668	IC SM L5972D (ST00) R
3153	232270260101	RST SM 0603 RC21 100R PM5 R	3425	212211805641	RST SM 0603 RC0603 68R PM5 R	7005	933589600215	TRA SIG SM BC847C (PHSE) R
3154	232270260101	RST SM 0603 RC21 100R PM5 R	3426	212211805641	RST SM 0603 RC06			

7151	932222035668	IC SM TPA3005D2PHP (TI00) R
7201	935245720165	IC SM 74HCT1G14GW (PHSE) R
7202	932217232668	IC SM S524C20D21 (SMGK) R
7301	313815864021	CPU ASSY(AUO 20)
7301	932222010682	IC SM NT68F632ALG (NOVA) L
7302	933589600215	TRA SIG SM BC847C (PHSE) R
7303	932219183685	IC SM LM809M3-2.93 NOPB(NSC0)R
7304	932216733668	IC SM LD1117S33 (ST00) R
7305	313815864031	EEPROM ASSY(AUO 20)
7305	932212209682	IC M24C32-WBN6P (ST00) L
7401	932222015671	IC SM MST51502L-LF (MSTA) Y
7402	932216732668	IC SM LD1117S25 (ST00) R
7403	932216733668	IC SM LD1117S33 (ST00) R
7404	932216733668	IC SM LD1117S33 (ST00) R
7501	823827716781	1M16-42S16100A1
7502	823827716781	1M16-42S16100A1
7621	935276561557	IC SM SAA7119E/V2/G (PHSE) Y
7622	932220099685	IC SM LD1117AS18 (ST00) R
7623	932216733668	IC SM LD1117S33 (ST00) R
1052	313815860801	YPbPr-IN PCB ASSY
0289	313800992061	PROCESS BOX
1931	242202605741	SOC CINCH V 3P F 1L3 GNBURD Y
2933	223886715229	CER1 0603 NP0 50V 22P PM5 R
2936	223886715229	CER1 0603 NP0 50V 22P PM5 R
2939	223886715229	CER1 0603 NP0 50V 22P PM5 R
3931	212211805638	RST SM 0603 RC0603 33R PM5 R
3932	212211805964	RST SM 0603 RC0603 75R PM1 R
3933	212211805638	RST SM 0603 RC0603 33R PM5 R
3934	212211805964	RST SM 0603 RC0603 75R PM1 R
3935	212211805638	RST SM 0603 RC0603 33R PM5 R
3936	212211805964	RST SM 0603 RC0603 75R PM1 R
8931	313819874561	CBLE -265 5/70/5-001 AWG28
1053	313815860881	KEY BOARD ASSY
0001	313810360171	KEY BOARD
0289	313800992061	PROCESS BOX
1903	242212800116	SWI TACT 1P 1POS 12V V 1MM5 R
1904	242212800116	SWI TACT 1P 1POS 12V V 1MM5 R
1906	242212800116	SWI TACT 1P 1POS 12V V 1MM5 R
1907	242212800116	SWI TACT 1P 1POS 12V V 1MM5 R
1908	242212800116	SWI TACT 1P 1POS 12V V 1MM5 R
1921	823827716481	CON BM H2P M1.25
2904	223858615636	CER2 0603 X7R 50V 10N PM10 R
3906	232270260471	RST SM 0603 RC21 470R PM5 R
3907	212211805661	RST SM 0603 RC0603 2K2 PM5 R
3909	232270260332	RST SM 0603 RC21 3K3 PM5 R
3910	212211805665	RST SM 0603 RC0603 4K7 PM5 R
3911	212211805656	RST SM 0603 RC0603 1K PM5 R
1054	313815860811	IR PCB ASSY
0181	313815415561	IR HOLDER
0182	313815415571	LED HOLDER
0289	313800992061	PROCESS BOX
1902	243812800224	SWI PUSH 2P 0.2A 20V SFPC12 B
2901	223878615649	CER2 0603 X7R 16V 100N PM10 R
2902	222278019763	CER2 0805 Y5V 16V 1U PM20 R
2903	223858015636	CER2 0805 X7R 50V 10N PM10 R
3901	232270260103	RST SM 0603 RC21 10K PM5 R
3902	232270260101	RST SM 0603 RC21 100R PM5 R
3904	232270260221	RST SM 0603 RC21 220R PM5 R
3905	232270260221	RST SM 0603 RC21 220R PM5 R
6901	313815862261	IR + HOLDER ASSY
6901	932220313667	IR RECEIVER TSOP34136SB1 L
6902	313815862171	LED + HOLDER ASSY
6902	932214603682	LED VS L-3WYGW (KIEL) B
7901	933628680215	TRA SIG SM BC858C (PHSE) R

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